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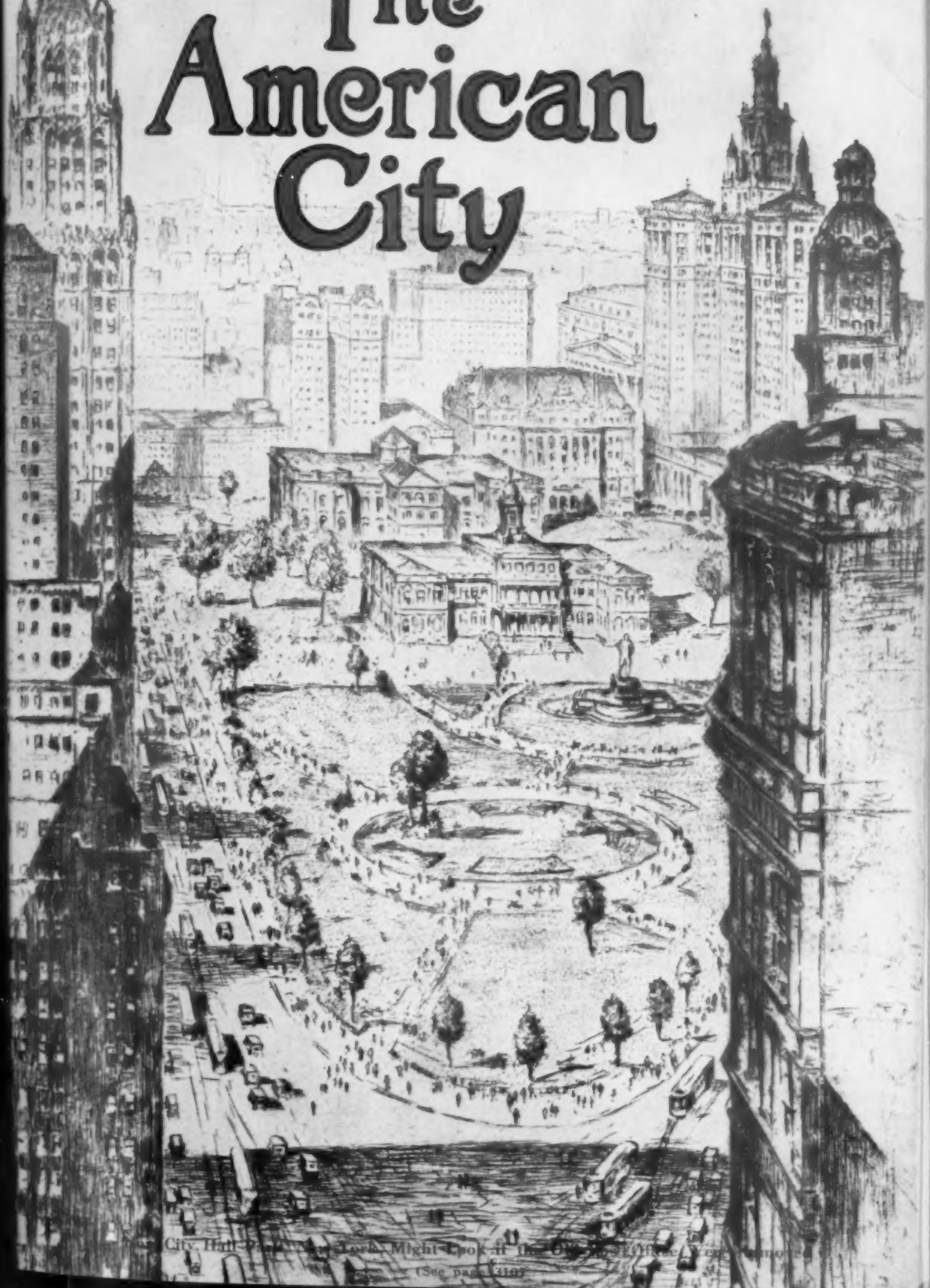

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(See page 130)

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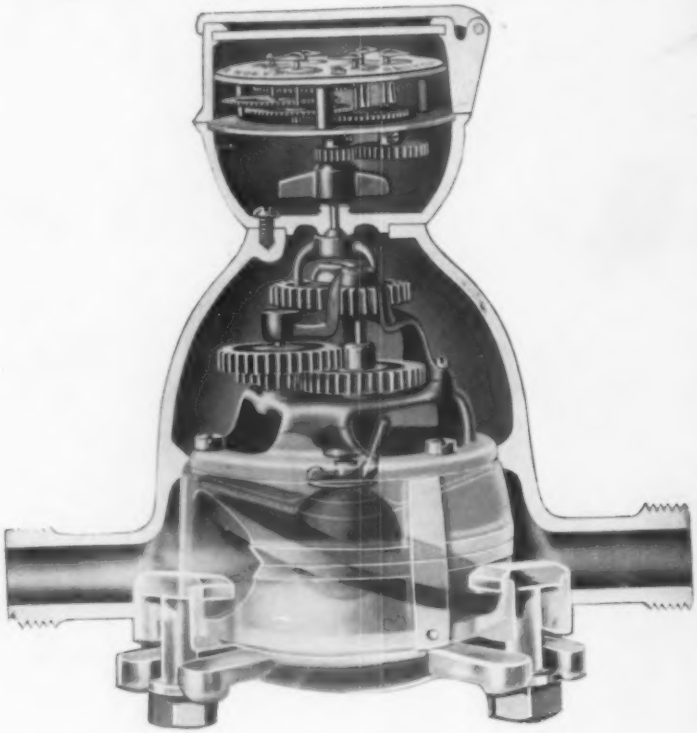

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The American City

SEPTEMBER
1927

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Something More Than Locking and Unlocking Cell Doors

A Report on European Methods and Ideas of Penal Treatment, Prepared for the National Crime Commission

By Louis N. Robinson

Secretary, Sub-committee on Pardons, Parole, Probation, Penal Laws and Institutional Correction

THOUGH there is no let-down in Europe in the general attempt to make punishment for wrong-doing swift and certain, the thing that strikes one's attention is the absence of any tendency to turn to more severe penalties or to a harsher prison régime in the effort to stamp out crime. Everywhere there is manifest a movement to soften the asperities of the penal law and to mitigate the former harshness of prison discipline. The long sentences recently imposed by certain American judges are regarded by European students as a return to the cruelty of the Middle Ages, and a further increase in the barbarities of our prisons is difficult to explain to those Europeans who have in the past looked to America as the birthplace of new ideas with respect to the worth and dignity of all members of mankind.

Police Efficiency and Crime Reduction

The question will now be asked: On what do European countries rely to keep down crime? Leaving out of account those social ameliorations of which we are all, both Europeans and Americans, fully conscious as tending to lessen crime, I would say that the main reliance is on the police. In other words, while we Americans seem to think that crime can be held in check by punishing severely an insignificant fraction of our criminals, Europeans believe that it is far more effective to impose reasonably mild penalties on a large proportion of those who offend. A short time ago, an investigation in two of the leading cities of Missouri revealed the fact that whereas information had been laid before the police concerning some fourteen thousand major felonies, arrests had followed in only eight per cent of the cases. Worse—it was shown that a total of only three per cent had been found, or had plead, guilty. To trust in the efficacy of punishing severely the three per cent while allowing the ninety-seven per cent to escape scot-free would scarcely appeal to a European as an example of our boasted efficiency or our hard common sense. They, on the contrary, have built up non-political police forces that make it decidedly risky for an individual to engage in crime.

A Definite Standard of Care and Treatment

The second thing that impresses the visitor to European prisons is the exisence, in the care and treatment of prisoners, of a standard of care steadily and faithfully maintained. Our constantly shifting personnel, the almost complete absence of any known qualifications for guards and officers, and the unthinkable muddle with respect to prison labor which together make impossible the development of a definite standard of care and treatment of prisoners in the United States, are difficulties which if not wholly unknown in prison administration in European countries, are of far less importance and in no way nullify what I have said with respect to the existence of a definite standard of care and treatment that is steadily and honestly maintained from year to year wholly unaffected by changes in the balance of power

as between the various political parties within a given country. To throw out the entire staff of a prison from the warden down to the lowest guard simply to make places for the friends of the incoming administration, and to have this process repeated over and over again, as has been done in many of our states, is a thing utterly abhorrent to the European's notion of public administration or of proper public protection of society from crime. All prison officials from the highest to the lowest who are faithful and suitable for the work can look forward to advancement and to a secured position from which they can not be ousted except for genuine fault or neglect of duties. I do not mean to imply that their system is ideal from every standpoint; the important thing is that they actually do what they profess to do. There is no such gap between ideals and practice as one finds in the United States.

Relation of Staff to Administrative Problems

The influence of a permanent trained force on certain problems of penal administration is of great significance. In America, the inner cell block has been deemed an essential feature of prison construction on account of the greater security offered by this form of building plan. I saw no interior cell block in any of the prisons visited; each cell was built against the outer wall with a window that could be manipulated by the prisoner himself. Escapes, I find, are practically unknown, and one is forced to conclude that the interior cell block is simply an effort on our part to obtain security, at the expense of the prisoner in light and air, by the substitution of the art of the builder for the morale of a permanent administrative staff.

Or take the matter of granting release on parole for instance in Belgium. It would be rather difficult to imagine men being released wholesale at the expiration of their minimum sentence, as is so commonly done in American prisons. Continuous observation of the individual prisoners by administrators secure in their position, acting slowly and carefully as judges might be assumed to act, results in a far closer approach to our ideal of the indeterminate sentence than one is accustomed to find at home.

The evanescence of many of our penal reforms, to take still another example, is only too evident, dependent as they often are on the unsupported efforts of a chance reform administrator. The contrary is to be noted in Europe. New ideas, after a period of trial, are slowly woven into the prevailing prison administration and continue in effect without relation to the fate of the innovator. Good ideas are not thus lost, as with us, to be discovered again in the course of years by someone else.

Prison Labor

I cannot stress too strongly the fact that I saw no idleness in European prisons, this in great contrast to what is painfully visible in many of our great prisons and in nearly all of our local county jails. In England and in Germany, strange to say, where between one and two million free men are out of work in each country, the prisoners were all at work. It is true that the work was often conducted in a manner comparing very unfavorably as to efficiency with work carried on in the free world outside. Old types of machines were in use and much work that could be done by machine methods was performed by hand. The essential thing to remember, however, is that work of some kind was found for each and every prisoner able to be out of bed. By the public, the work was viewed from two angles: it was both part of the penalty for crime and at the same time a necessary humanitarian condition of shutting a man away from his fellows. In all countries visited, this second reason for work in prisons had so far penetrated the public conscience that work was offered as a matter of course even to men awaiting trial.

A Revaluation of Imprisonment

Within the last few years, the use of imprisonment as a penalty for crime has been under serious consideration. Many thought-provoking questions have been posed. Here are three, the answers to which I shall attempt to set down: (a) Has too much use been made of imprisonment? (b) Can something else be substituted for imprisonment? (c) Is it possible to make imprisonment a more effective weapon against crime? I may say at once that an affirmative answer has been given to all three questions.

In the first place, the evil consequences to society itself of shutting a man away from his fellow beings have finally come to be recognized. The loss of earning capacity, the loosening of family ties, the social stigma, the possibility of contamination, and weakening of morale, the difficulties of readjustment are evils borne not alone by the man who undergoes the imprisonment but by the rest of us who cannot, no matter how hard we try, cut ourselves loose from the criminal. We suffer with him, not mentally to any great extent perhaps, although the faithful adherence to any kind of religion would cause us to do so, but practically from the loss of money taken from us through taxes for his support, and from further injuries

which this man, less suited than ever to dwell in society because of his enforced absence from it, is likely to do to us. Imprisonment is therefore not something to be used lightly without thought of the damages it may do.

Fines Replacing Imprisonment

All along there has been an element of unfairness as between rich and poor in the use of imprisonment. The punishment for many crimes has been and is still an "either-or" punishment; that is, either a fine or a certain term of imprisonment. In the United States for example, the statistics for 1923 show that 46.9 per cent of the commitments to prison were for non-payment of fine. The rich have paid the fine and the poor, not having the money, have gone to prison. Now, with the increasing political power of the poor man, there is a tendency to right this wrong by allowing him to pay his fine in installments out of his daily or weekly earnings.

Not only is this tendency to deal more fairly with the poor man plainly discernible in the countries visited, but there is also a definite movement to use a fine *instead* of a term of imprisonment wherever the law allows; in fact, new legislation, in Germany particularly, will soon add to the number of crimes for which a fine can be given as the penalty instead of imprisonment. The plan of allowing the poor to pay their fines in installments and the substitution of fines for imprisonment is one explanation that is commonly given in England for the fact that no English prisons are overcrowded, and a few have even been closed although convictions more surely follow crime than with us.

Probation Another Substitute

The use of probation is increasing. Particularly is this true in England, a fact which together with the increasing use of fines accounts for the real decrease in prison commitments. On the continent, probation for juveniles is well established, and a movement is under way to make possible a broader use of probation in connection with adult offenders. For example, in Belgium only those adults whose sentences would be less than three months can now be placed on probation. It is expected that this limitation will shortly be removed. An interesting fact to be noted in regard to the collection of fines in England is that the probation officers do not want this work thrust upon them, feeling that it places upon them a task not in harmony with the work of personal assistance to the individual which they are trying to perform.

Briefly, then, one may summarize the present attitude by saying that there is, with one exception which will be noted later, a growing disinclination to imprisoning people and that an improved fining system and the use of probation are substitutes suitable for use in many instances.

Changes in the Character of Imprisonment

When it comes to making imprisonment more effective, it is clear to the observer that there are many ideas at work, some of which have already borne fruit.

It is a well-known fact that the Pennsylvania system of separate and solitary confinement

Profiting by European Experience

Shortly after the organization by the National Crime Commission of its Subcommittee on Pardons, Parole, Probation, Penal Laws and Institutional Correction, it was decided that the secretary, Dr. Louis N. Robinson, should go to Europe for the purposes both of observing the present methods there used in dealing with convicted offenders and also in order that he might become thoroughly conversant with European ideas of penal reform. Through the cooperation of the Federal Department of Justice, the assistance of our foreign embassies in England, Belgium, Holland and Germany, was secured in making official contacts.

Because of the great value, to those who are seeking a solution for our present difficulties in dealing with crime, of the report on this trip just submitted by Dr. Robinson, it is here presented in full for the benefit of The American City's readers.

The Executive Committee of the National Crime Commission, with headquarters at 120 Broadway, New York, consists of the following members:

Dr. E. A. Alderman	Louis McH. Howe
Hon. Newton D. Baker	Hon. Charles E. Hughes
Hon. R. Washburn Child	Sam A. Lewisohn
Hon. F. Trubee Davison	Hon. Frank O. Lowden
Mrs. Richard Derby	Gen. Samuel McRoberts
Gen. James A. Drain	Hon. F. D. Roosevelt
Hugh Frayne	Chester H. Rowell
Hon. Herbert S. Hadley	

Members of the Sub-committee on Pardons, Parole, Probation, Penal Laws and Institutional Correction, under the chairmanship of former Governor Lowden, are:

Arnold Bennett Hall	Hon. George L. Radcliffe
Mrs. Jessie D. Hodder	Hon. Charles S. Whitman
Hon. Clark Howell	Sam A. Lewisohn
Hon. Sumner T. McKnight	Louis N. Robinson

which had so little vogue in this country became the accepted form of penal discipline in Europe. Little by little, England has been turning away from this scheme until now only traces of this system can be found in English prisons. Germany, too, is giving up this idea and one must now go to Holland and to Belgium to find in full force this scheme of isolating each prisoner from all other prisoners. Working, eating and sleeping in their cells, wearing masks in the corridors, exercising in separate yards, listening in chapel to the man of God while sitting in what are best described as open-front chicken-coops, the prisoners of these two countries serve their terms without contact or communication other than that which escapes the notice of the prison officials. Even in these two countries, however, this system of imprisonment is under constant criticism by those who believe that the Auburn system of common work-rooms and isolation at night is more beneficial—or shall we say less injurious—to the ordinary prisoner.

The Progressive System

In Germany today, there is the livest possible interest in the progressive system of penal administration. In all the institutions visited, the prisoners were divided into groups, usually three in number, differing somewhat widely as to privileges and general living conditions. In the Thuringian prison of Untermassfeld, for example, the upper or more advanced group constitutes a self-governing unit within the general prison administration. Membership in this group can be obtained only by and with the consent of those already enjoying the privileges which go with this stage of development, among which, interestingly enough, is the right to go on Sunday for a walk in the Thuringian forest accompanied only by the warden and the school instructors. England has long known the merits of the progressive system and has a firm belief that through it imprisonment can be made a much more effective training for wayward and undisciplined individuals.

All Youthful Offenders to Be Trained During Imprisonment

The idea of an adult reformatory took root in England in 1908 when the first Borstal institution for boys between the ages of 16 and 21 was opened. Since then several others have been established for both boys and girls. The continent has been much influenced by the English example. Germany has now a flourishing reformatory at Witwich and Belgium has two, an agricultural one at Merxplas and an industrial one at Ghent. Even Holland, conservative as it is, has developed an agricultural reformatory at Veenhuisen. The important thing to be noted about this movement is the emphasis placed upon individual instruction. With that end in view, the institutions are kept small, and an effort made to prevent the development of any wholesale system of regimenting the young criminals who are there.

Adjusting Prison Life to the Individual Prisoner

No two prisoners are alike and yet, in the past, little attention has been paid to this fact by prison administrators. This obvious defect has been officially noted and a thoughtful remedy applied in both Belgium and Bavaria. In Belgium, all recidivists and all who have received a sentence of over three months are thoroughly studied and their history carefully gone into. The anthropological, the sociological, the psychological and the psychiatric viewpoints are all included in this examination and the facts are assembled in record form for use of the prison administrators in deciding on the work assignment, methods of discipline, training and justification of release before the expiration of the full sentence. When a man leaves prison, his record is sent to the central office in the Forest prison in Brussels. If he is resentenced for another crime, his record will be sent from the central office to the prison in which he must serve his sentence. A similar scheme has been developed in Bavaria and the records centralized in the prison of Straubing. The possibilities inherent in a service of this kind can be best illustrated by an actual case recently uncovered in Pennsylvania. A young man, in company with others, broke into a vacant cottage, was arrested, tried and sentenced to the penitentiary. After serving his minimum, he was released on parole fortunately under the oversight of a private organization. A little investigation revealed the fact that this young man had escaped from an institution for feeble-minded in Massachusetts that was only too glad to take him back. Of course, the fact of his feeble-mindedness should have been discovered at the trial, but it would be consoling to know that cases of this kind would at least be discovered in prison in time to determine treatment and conditions of release.

Centralized Control and Differentiated Institutions

Centralized control which I found in all countries visited makes possible a greater use of the results obtained from the study of in-

dividual prisoners than would be the case if each prison was run as a separate institution. It makes it possible for a prison to be used for a special class or type of criminal and thus gives rise to differentiated imprisonment, undoubtedly more effective in the effort of society to curb crime than a system of imprisonment common to all penal institutions. England, which has not yet established as comprehensive a system of research in the prisons as has either Belgium or Bavaria, has nevertheless gone further perhaps in the utilization of results through centralized control than has either of these two countries. For example, the prison of Wormwood Scrubs is now used exclusively for men who have never previously been in prison and for the young men released from some Borstal institution who have broken their parole. To Wakefield prison are transferred a class of prisoners, not necessarily first offenders, whom the wardens of other prisons have thought would benefit from the kindly and intelligent régime that prevails in this prison. The Borstal institutions, or adult reformatories, as we call them, tend also to specialize. To Portland are sent those who have had previous prison experience and those whose records reveal a difficult type of individual. Feltham, on the other hand, received those least far on in crime, also those mentally retarded. Ordinary cases without special distinguishing characteristics are sent to the original Borstal institution.

In England, centralized control has aided greatly in the carrying out of a plan for dealing more effectively with habitual offenders. A special sentence of from five to ten years, called Preventive Detention, is imposed on habitual offenders *in addition* to the sentence of penal servitude specified by law for the crime in question. This special sentence is served at Camp Hill, located on the Isle of Wight, after the man has served his regular sentence in one of the convict prisons. Camp Hill prison is not, strange to say, a prison where sterner methods of discipline are in force. On the contrary, the prison is run on the plan of giving more freedom to the individual prisoner and offering more opportunities for the growth of a sense of social responsibilties than the other prisons of Great Britain. The idea of reducing crime through greater control of those whose lives are one long record of offenses against society is now much discussed on the continent, and will probably result in the establishment of prisons offering full opportunities for reform, but maintained also as custodial institutions for those whose repeated offenses show them as largely incapable of living the normal life of a citizen.

New Types of Wardens and Guards Wanted

The fact that imprisonment can and should be made a more effective discipline is provoking an unusual and widespread discussion of prison personnel. In England, it has been customary to appoint as wardens or governors, as they are called in that country, army or navy officers who know something of the knack of handling men in groups. Wardens of this type have succeeded in maintaining good discipline and are for the most part successful and honest administrators. It is, however, pretty much agreed now by everybody that the present notion that imprisonment can be used for alteration of character demands wardens of another cast of mind, men not so much interested in maintaining discipline as in developing the best side of each individual prisoner. In Germany, warden after warden has said to me that he could not make the term of imprisonment what the people of the country now wished it to be unless he was given guards and other assistants of greater intellectual capacity who could understand something more than locking and unlocking cell doors. One warden said: "I provide lectures for the prison staff, but most of it, I fear, goes over their heads." High officials in the government are perfectly aware of the situation, but insist that higher salaries will have to be paid in order to attract men of more ability and that can not be done until Germany has more fully recovered from the economic consequences of the war. Murchison speaks of a certain prison in the United States where the inmates averaged nearly a hundred per cent higher in the Alpha test than did the guards of that same prison. In view of this fact, the question may properly be asked: Whose character, guard's or criminal's, will be changed by contact in this prison?

The Reform Movement Growing

It is interesting to note that in all countries visited the war has strengthened the penal reform movement. I do not mean by this that it has brought about a "coddling" of prisoners; rather has it led to a thorough going-over of what is being done with and for criminals. The result has been the loss of self-complacency and a revelation of the futility of measures long unquestioned in the field of penal administration. With more money at their disposal, the partially developed reforms would, I am convinced, soon be carried through to completion. Having already achieved a definite standard of care and treatment, they would not find it difficult to build new structures on this substantial foundation of administrative achievement.

Private Owners Can Prevent Violations of Zoning Ordinances

By Edward M. Bassett

President, National Conference on City Planning

MANY private landowners in zoned municipalities do not understand how fully they can protect themselves against violations of zoning ordinances even if the authorities fail to act or act in an ineffective or erroneous manner. Nearly all the state zoning enabling acts provide that, if a neighbor considers that he is injured by the granting of a particular building permit by the building inspector in violation of the zoning ordinance, the neighbor can immediately take the matter to the board of appeals and thereafter to the court. Or if the applicant for the permit appeals to the board of appeals and the neighbor considers that the determination of such board violates the zoning ordinance, the neighbor can likewise take the matter to the court.

Sometimes violations occur where no application for a building permit is made. It is well known that in such cases the municipal attorney ought to take steps to prevent or abate the violation. Sometimes he does not. What is the injured neighbor to do? He can go ahead, if he wants to, on his own responsibility, and ask the court to enjoin the violator. The first zoning case of this sort arose in Greater New York in 1917 (Whitridge v. Park, 100 Misc. 367, affirmed 179 App. Div. 884). The court refused the injunction in this case because the plaintiffs did not allege special damages. In all later cases in New York state the plaintiffs have been careful to allege special damages, and if they presented a meritorious case they have won. The plaintiff simply has to be careful to state that he is specially damaged to the extent of one thousand dollars or some other definite figure.

A Splendid Decision by the Highest Court of Connecticut

A case of this sort has just been decided by the highest court of Connecticut, which is so interestingly and well reported by the correspondent of the *New York World*, July 29, 1927, that it deserves to be quoted in full:

"An important zoning law decision of interest to all suburban communities in Connecticut, and perhaps elsewhere, was handed down last Tuesday by the Supreme Court of Errors, Third Judicial District, at New Haven, when the Court, by unanimous opinion, held that any specially damaged property owner has the right to proceed to enforce the zoning law regardless of whether or not the authorities are acquiescent in the violation.

"The decision was in the action brought by Mrs. Margaret Cook Fitzgerald of Riverside, Conn., against the Merard Holding Company, Inc., claiming the company had violated the zoning law, passed by the town of Greenwich, Feb. 1, 1926, restricting Riverside Avenue to residential purposes.

"Subsequent to the adoption of the law the Merard Company began the erection of four stores directly opposite Mrs. Fitzgerald's residence. During the erection the Zoning Commission notified the company that its undertaking was in violation of the zoning regulations. The company ignored the notice and completed the four stores.

"On several occasions following, Mrs. Fitzgerald requested the Zoning Commission and its officers to prevent by legal or other proceedings the erection of the building. Among the remedies she suggested were the abating of the violation, the prevention of occupancy of the building and land for business purposes and restraining the use of the same by the defendants.

"The commission, however, refused to take action. Mrs. Fitzgerald then brought action on her own account. In defense to her action in the lower courts the Merard Company and the store tenants interposed demurrers, urging that action in the matter could only be taken by the town authorities and not by any private property owner.

"The demurrer was appealed from to the Supreme Court of Errors, the highest court in Connecticut, and the decision of that court last Tuesday was a complete victory for Mrs. Fitzgerald.

"The decision, written by Chief Justice Wheeler, denounces the Zoning Commission's failure to act as a violation of its clear public duty. It then goes on to show the use of the stores and roadway destroyed the values of Mrs. Fitzgerald's property for residential purposes, while the zoning law utterly destroyed its value for business purposes.

"Under these circumstances the Supreme Court of Errors held that the lower courts were in error in sustaining the demurrer of the defendants and allowing the stores to go on in direct violation of the zoning law simply because the Zoning Commission refused to take action in fulfilling its public duties.

"Regardless of the inactivity of the Zoning Commission and the town authorities, the court decision held, Mrs. Fitzgerald, as a property owner, whose rights were being abused, was vested with the right to maintain an action on her own accord to compel the owner of the business building to conform with the zoning regulations, and to restrain the defendants from using the building for business purposes."

The regular monthly department of Zoning Notes, by Frank B. Williams, appears on pages 401 and 403 of this issue.

EXTERIOR OF THE RONCEVERTE FILTRATION PLANT

The New Filtration Plant at Ronceverte, W. Va.

City of 2,300 Installs Strictly Modern Plant and Standpipe

THE city of Ronceverte has recently completed a new filtration and pumping plant to purify the water pumped to the city from the Greenbrier River. This plant, which is situated between the Chesapeake and Ohio Railway shop and the Greenbrier River, is capable of handling 500,000 gallons of water per 24 hours. The city's present requirements of about 180,000 gallons daily are filtered and pumped in about 9 hours.

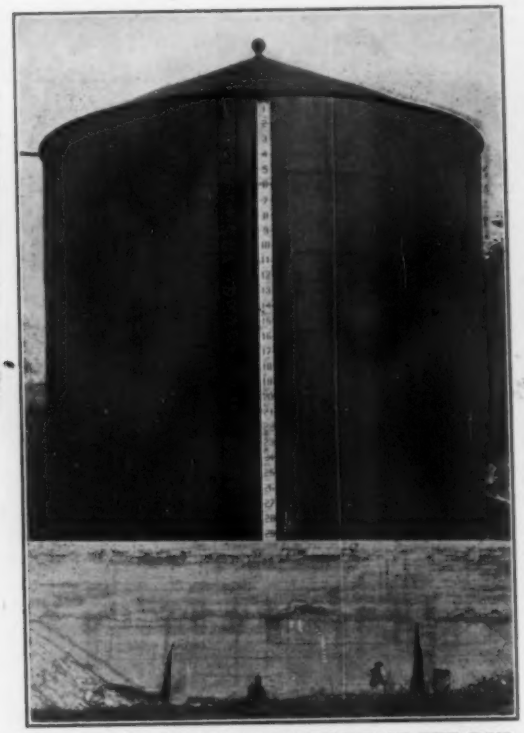
The filtration plant is built of reinforced concrete and consists of an intake well, a mixing chamber, a settling basin, two filters, a filtered-water well, the necessary pumping and controlling equipment, a pair of raw-water pumps to pump the water from the river to the filter plant, and a pair of high-pressure pumps to pump the filtered water to the town and reservoir, and chemical tanks for holding the solutions of alum and lime used in filtering the water. A chlorinator is also a part of the equipment.

In the operation of the plant, the raw river water first passes by gravity through two 10-inch pipes into the intake well on the edge of the river. This well has large screens for preventing leaves, trash and fish from entering the pump and has valves for closing off the river water when it is necessary to clean the well or screen or to repair the foot valves or the suction pipes. From the intake well the water is pumped through two 6-inch suction pipes by two small electric motor-driven raw-water pumps in the corner of the pump-room to the mixing-chamber under the chemical tanks. As the water enters the mixing-chamber, it is dosed with alum, and in passing around the timber baffles for a period of about ten minutes it is thoroughly mixed. From the mixing-chamber this treated water passes through a 12-inch pipe to the farther end of the settling-basin, where it passes out near the bottom. It then flows quietly toward the filters, passing upward over a baffle near the center and downward to the bottom again, from whence it passes upward to a trough near the top at the end under the mixing chamber. From here it goes through two 8-inch pipes to the filters.

Filters

The filters are built with 30 inches of sand over about 60 inches of gravel, which is underlaid with a perforated strainer pipe which carries the water to two small basins, one for each filter. From the basins it flows to the filtered-water well, which is beneath the pump-room and filter floors. Chlorine is applied to the water in passing through these small basins. From the filtered-water well, the water is pumped by two high-pressure pumps to the steel city reservoir on Reservoir Hill.

The purpose of the small tile-lined basins through which the filtered water passes on its way to the filtered-water well, is to give the operator at all times a convenient test as to what results are being accomplished by the filters, as the passing of any cloudy water would show him that something is wrong.



HALF-MILLION-GALLON STANDPIPE OF THE RONCEVERTE WATER-WORKS

They also serve as controllers of the rate at which the water must pass through the filters. This is accomplished by means of floats in one end of these basins beneath the metal covers. These floats in turn regulate the openings in the float-valves in the filter discharges and maintain a uniform depth of water in the basins. With this uniform depth of water over the 3-inch circular openings in the bottoms of these basins, the rate of flow will always be the same.

Pumps

Only one pump of each set is operated at a time, the other being held in reserve. Either battery of pumps has the same capacity as the filter plant, and the whole plant is designed to operate at the same rate of flow, that is, the raw-water pump forces water into the settling-basin at the same rate at which it passes through the filters, and the high-pressure pump draws it out of the filtered-water well at the same rate, except that when the tank is nearly full the pressure rising in the high-pressure pump causes it to deliver water more slowly. The pumps are operated by electric motors, the power being furnished by the Virginia-Western Power Co.

Chemical Treatment

The chemical feeding apparatus is provided with three concrete solution tanks, two for alum and one for lime. The lime is used only when the character of the river water is such that it will not react with the alum and form a floc. This condition of low alkalinity must be taken care of by the addition of lime. The quantity of alum used is very small, being ordinarily about 0.7-grain of alum to a gallon of water, or about twelve parts of alum to one million parts of water by weight. When the water is muddy, this may be increased to two or three grains per gallon for short periods. The alum added does not go through with the filtered water, but is broken down, settled, and strained out in the filtration processes described above. The only change made in the chemical content of the water is that a portion of the temporary hardness is changed to a permanent hardness, but the total hardness remains the same. The amount of chlorine used is very small, being less than one part to two million parts of water. It is believed that this amount may be sufficient to be occasionally tasted. A faint taste of this chemical should not be objectionable, and the user can always feel sure when this is present that there are no harmful germs accompanying it.

Filter Building

The filter building is constructed entirely of concrete, brick and steel, with no timber except the roof joists and sheathing, so there is no danger that the water-works building will be destroyed by fire.

Steel Standpipe

The new reservoir is a steel standpipe 36 feet in diameter and 3 feet high, holding 250,000 gallons, and is located at one end of the old concrete reservoir. A portion of the old reservoir is walled off from the standpipe end and can be used for holding a reserve supply while repainting the inside of the new tank, which is to be done at least once every three years. The new standpipe gives from 8 to 12 pounds increased pressure over the old reservoir. The increase was needed badly in some portions of the residence district and at the city schools.

The construction work was done by the Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa., and was completed in but little over four months after the first breaking of the ground. The plant was designed by Howard K. Bell, of Lexington, Ky., who also supervised the construction.

An Analysis of Pumping Equipment Costs

By A. W. Baker

WATER, one of the essentials of life, is required to serve three important and necessary functions in every municipality; first, the general use of the people, that is, drinking, cooking, bathing, etc.; second, sewage disposal; and, third, fire protection. As far back as history records, the question of an adequate supply of water for municipalities has presented an extremely important problem. In the days of the Roman Empire, the Caesars directed their engineers to build the famous aqueduct, part of which survives to this day, to bring water from the hills outside the city of Rome by gravity.

During the past two thousand years, other towns and cities that had available a water-supply at a sufficient elevation have copied the old Roman system and installed aqueducts to provide water-supply by gravity. As the population of the world has grown and civilization increased, the number and size of municipalities have increased, with their ever increasing demand for water.

Progress Portrayed

The author compares in an interesting manner the high-efficiency pumping engines with the newer centrifugal pumps for water and sewage. Valuable comparative cost data are given from many cities in the United States.

The more comfortable mode of living of today has brought about a marked increase in the demand for water. In the past few years, in the smaller cities, the average demand has increased from 30 to 80 gallons per capita. In the larger cities, even where meters are used, the demand has increased from 100 to 150 gallons per capita. There are better homes being built, more bathtubs being installed, more lawns and flowers being watered, etc., which means that more attention must be paid to the supply system in order to meet these demands.

It was not until after the invention, design and development of reciprocating engines and pumps, in the past century, that water was supplied to municipalities by power-driven machinery. This development made rapid progress in the last half of the nineteenth century and the early part of the twentieth century. Large reciprocating pumps of the crank and fly-wheel design became so efficient that the best performance for such units would give two hundred million foot-pounds per thousand pounds of steam. On the other hand, these units were extremely large, expensive in first cost, and required a large number of operators, and their many valves and reciprocating parts had naturally a high maintenance cost.

Electric-driven Centrifugal Pumps for Water-Works

With the advent of electricity, pumping engineers and electrical manufacturers addressed themselves to the problem of handling liquids of all kinds by contrifugal pumps, with the result that today pumps are equipped with squirrel-cage induction motors, wound rotor induction motors, synchronous motors, direct-connected steam turbines, and steam turbines geared to the pumping unit. The efficiency and economy obtained, taking all factors into consideration, have brought about their extensive adoption. As compared with steam-driven, vertical triple expansion pumping units for municipal work, the motor-driven outfit occupies less room and results in greatly reduced expenditure for maintenance and supervision. Where water is supplied to reservoirs or storage tanks, the operation of motor-driven pumps may be rendered entirely automatic by the use of float or pressure switches, which can be adjusted to start and stop the motor promptly when variations in the water-level occur, and thereby tend to maintain water storage at any required volume. Where current is purchased from central stations, it is frequently feasible to arrange pumping periods so that the maximum demand for current will occur during off-peak periods, which in turn, makes feasible the quoting of low rates for current.

Sewage Pumps

In sewage disposal plants, centrifugal pumps are generally used, as their construction enables them the successfully handle liquids containing a large percentage of solid matter in suspension. The operating conditions of sewage disposal pumps usually comprise low head and relatively large volume. A typical example in this district is the synchronous motor-driven disposal pumps in the city of New Orleans, La. In fact, the pumping situation in New

Orleans is unique, as the city normally lies below the level of the Mississippi River, which requires three departments of pumping for the municipality—one for general use of water through the filtration plant, one for the drainage system, and one for sewage disposal system. All of this water has to be pumped from the lower level of the city back into the river. Where central station power is not available and local conditions do not permit electric drive, turbine-driven pumps in general make the most economical method of handling water.

Steam-Turbine-driven Pumps

For a long time, manufacturers were confronted with the problem of adapting steam turbines to centrifugal pumps, trying to develop a unit that would be cheap in first cost, and comparable in efficiency with the high-efficiency reciprocating engine. The change in steam conditions of the past few years, such as higher pressures, higher superheat, and higher vacuum, has made it possible to use a reduction gear between the turbine and the pump, which makes a very satisfatory arrangement. At first the duty obtained from such an arrangement was not so good as the duty obtained from the engine units, but the low first cost of the units plus a reduction in building and foundation costs, which means a large saving in fixed charges, plus a saving in operating and maintenance expense, has made it profitable to install turbine-driven centrifugal pumps. Today it is entirely possible to build a turbine-driven pumping unit, with a guaranteed duty equal to, and in many instances greater than, that of the most efficient engine units.

Comparative Costs

The original cost of a reciprocating pumping engine of a certain size, including condensers, piping, boilers, tools and supplies is $147,000. The turbine unit of equal capacity would cost $58,000. Because of the difference in fixed charges, the turbine would operate for approximately $6,000 cheaper than the crank and flywheel set. There are notable examples of the turbine pump in Baltimore, Memphis, Nashville, Omaha and Philadelphia, mostly in units from 1,200 to 3,000 h.p.

Some of the most interesting and practical engineering studies are presented by municipal pumping enterprises. Steam direct, steam-electric, oil engine, electric or purchased power for electric drive all have to be considered and settled after carefully weighing all the complex conditions that bear upon the answer.

Where central-station power is available, the large generating station has a great advantage, as 1½ to 2 pounds of good coal will generate 1 kwh., whereas the small station will require 3 to 6 pounds of coal per kwh., and much greater operating cost per kwh. as well. The cost to small municipalities making their own current may be higher than that of purchased power. Reserve units in both municipal and private central stations, interconnecting with other hydro and steam stations and with adequate lighting protection have all worked to reduce the number of "outs."

Among the prominent synchronous motor installations are those at New Orleans, Louisiana, Albany, New York, Duluth, St. Paul and Lansing. Wheeling, W. Va., has 700-, 900-, and 1,300-h.p. units of the wound rotor, induction motor design in successful operation. The city of Detroit has one of the most efficient pumping units with an over-all efficiency "wire to water" of 84 per cent on a 70,000,000-gallon centrifugal pump driven by a 2,600-h.p. synchronous motor.

Interesting Examples

Some comparisons of operating costs of various types of drives as compiled by consulting engineers and others may be of interest.

Filtration plant pumps at Albany, N. Y., were changed from steam to electric drive on purchased power, with a saving of $30,000 per year for the past six years.

The cost of pumping per million gallons at Savannah, Ga., was cut from $65 for the steam system to $10 for the electric system.

Annual operation and repair cost on a 24,000,000-gallon electric station in Chicago is $3,000 as against $16,000 to $20,000 for a similar steam station operating at the same time.

Turbine pumps, reciprocating pumps, and, as a matter of fact, all pumps, have their special fields, but in recent years the tendency has been toward electrically driven pumps where local conditions permit. The great increase in the ratio of electrically driven pumps to pumps driven by other means may be said to be due to the following:

The transmission of power at high speed naturally means low torque and small dimensions in general, with consequent low weight and cost.

The installation of an electrically driven pump is a comparatively simple matter as to foundation, piping and wiring.. Such pumps can be installed in convenient places over a wide area without material loss of energy in transmission.

The control for motor-driven pumps can be

designed for every possible condition of operation, giving an option as to hand or automatic, adjacent or remote control.

Speed variation, heavy starting duty and adequate protection may be provided for.

The power consumed by an individual pump may be indicated by its ammeter or watt-hour meter, making it easy to detect abnormal or misfit conditions.

ACKNOWLEDGMENT.—From a paper presented at the Southwestern Water and Light Association convention in Jackson, Miss.

Report of the United States Public Health Service on the Montreal Typhoid-Fever Situation

WITH 4,755 cases of typhoid fever, including 453 deaths, reported in the city of Montreal for the period March 1 to June 28, 1927, Montreal has suffered a severe epidemic of typhoid fever with a case incidence in proportion to population probably unprecedented by any other large city in the world within the present century.

With a special view to the determination of measures needed to prevent the spread of the infection from Montreal and vicinity into the United States, a survey of the situation was undertaken by a board of four officers of the United States Public Health Service, who spent from June 18 to 29 in Montreal. The report of the board, which is published in full in *Public Health Reports* for July 22, 1927, contains the following conclusions and recommendations:

Conclusions

(1) The typhoid fever epidemic in Montreal, Canada, since February 15, 1927, was beyond reasonable doubt caused by infection distributed in the output of milk from the plant of the Montreal Dairy Co. (Ltd.) in that city.

(2) Though contributory infection may have been introduced into the milk at one or more of the four stations or within the plant in Montreal, the preponderance of evidence is that the bulk of the infection was introduced into the milk at the farm sources and was enabled to multiply before the milk reached the city plant.

(3) Though it was barely possible for a very small proportion of whatever infection was in the milk to pass through the Pasteurization machine without being heated long enough and at a high enough temperature to be destroyed, the preponderance of evidence is that a very considerable proportion of the infected milk was passed through and distributed from the plant without being subjected to Pasteurization treatment.

(4) A large proportion of the milk which at the beginning of the epidemic was distributed through the plant of the Montreal Dairy Co. (Ltd.), and which is now presumably being distributed through other plants or channels to consumers in Montreal and elsewhere, is not now being officially controlled in such manner as to preclude its possible menace to the public health.

(5) Montreal is not yet a comparatively safe city for visitors who are likely to be susceptible to typhoid-fever infection.

(6) Milk and milk products derived from sources within the general vicinity of Montreal do not appear to be produced or processed under satisfactory sanitary conditions nor under official health supervision approaching adequacy.

Recommendations

(1) That state and local health officials and other persons concerned be advised that Montreal is not now, from a typhoid-fever standpoint, a comparatively safe city for tourists from the United States to visit and is not likely to be such for months yet to come, unless local health service in the city of Montreal and the vicinity thereof promptly is made much more nearly adequate than it now is.

(2) That such steps as may be necessary be taken to encourage or bring about under proper official supervision radical improvement in sanitary conditions under which milk and milk products are produced, handled, or processed in the city of Montreal or at any other place in the Province of Quebec within a radius of 100 miles of the city of Montreal for export to the United States; and that such milk or milk products after reaching points to which shipped in this country and before being distributed to consumers, be Pasteurized or otherwise processed under official supervision so as to be rendered free from typhoid, tuberculosis, or any other infection likely to endanger human health.

Rapid Spread of the Work-Study-Play School Idea

THERE are now 722 platoon, or work-study-play, schools in 120 city systems and two county systems in 34 states in this country, according to an oral statement of the Bureau of Education, Department of the Interior, quoted in the *United States Daily* for June 8. The total population of the cities having this type of school organization is over 17,000,000. Of the 120 city school systems, the Bureau reports, 34 cities, having a total population of 6,000,000, operate all their schools on the platoon plan.

The work-study-play organization is growing rapidly in the city schools of the United States because of the solution which it offers for crowded conditions, according to the Bureau. It was pointed out that under the traditional plan the school of 24 rooms usually accommodates 24 classes, while under the platoon plan the same facilities would accommodate 32 classes, thus saving the erection of eight rooms, or 33⅓ per cent. The Bureau's specialist in city schools, Miss Alice Barrows, estimates that an average cost for the erection of a schoolroom in the Eastern States is $15,000; thereby making the saving to the one building of $120,000 in building costs by the adoption of the platoon plan.

Effect of Laundry Wastes on a Small Sewage Treatment Plant

By I. Russell Riker

Senior Sanitary Engineer, Bureau of Engineering, New Jersey State Department of Health

DOMESTIC sewage was defined in 1925 by a committee of the American Public Health Association on Definitions for Sewerage and Sewage Disposal Practice as "sewage from dwellings, business buildings, factories or institutions. It may also contain a small proportion of industrial wastes. During dry weather the source of its liquid is the water-supply. In wet weather it may or may not receive ground, surface or storm water, depending on whether the system is separate or combined." If all sewages contained, as the definition states, only a small portion of industrial wastes, the troubles of those operating sewage treatment plants would be considerably lessened, but, unfortunately, this is not the case, as very often large quantities of foreign material find their way into sewerage systems.

After the sewage treatment plant has been constructed, the burden of its operation falls upon the operator, and in New Jersey on the State Department of Health. If the plant becomes overloaded or affected by the discharge of too much foreign material into the sewerage system, and the operator fails to obtain relief, the Department will move against the municipality. The Department has, however, no direct jurisdiction over the material discharged into the sewerage system. It has been found that industrial wastes not only overload a domestic sewage treatment plant in so far as quantity is concerned, but also place such a heavy burden upon it that the quality of the effluent has been seriously impaired. In some instances it has been necessary to make additions and alterations to a sewage treatment plant at a considerable cost to the municipality just to take care of an industrial waste.

Of all the foreign materials entering a sanitary sewer system, laundry waste is the most common. There is hardly a sewage treatment plant that is not influenced in some way by such wastes. For a number of years it has been found that from Monday noon until Tuesday noon of each week the effluent from a sewage plant is unusually cloudy, no matter what the type of treatment may be. The Monday flow is usually 20 per cent greater than the average daily flow. The plant quickly recovers its normal operation, and the rest of the week we find the effluent clear. While formerly it was the general custom for the dirty clothes of a household to be washed on the premises, and the dirty water from such washings was looked upon as part of the domestic sewage, there is now a tendency toward the establishment of large laundries. The washing of clothes, therefore, which originally would be done by individuals in their own home, is transferred to different districts and concentrated in large establishments. The process of washing clothes is too common to need any description. The refuse discharged from a laundry is grossly polluting material stronger than ordinary domestic sewage. It putrifies rapidly and may cause offensive growths. Some idea of the polluting nature of laundry wastes can be gained from the following analyses of the average samples:

Total solids p.p.m.	2,093
37° Col. per c.c.	3,200,000
Oxygen consumed p.p.m.	277
Color	80
Turbidity	1,000
Alkalinity p.p.m.	7,500
Ether soluble material p.p.m.	1,408

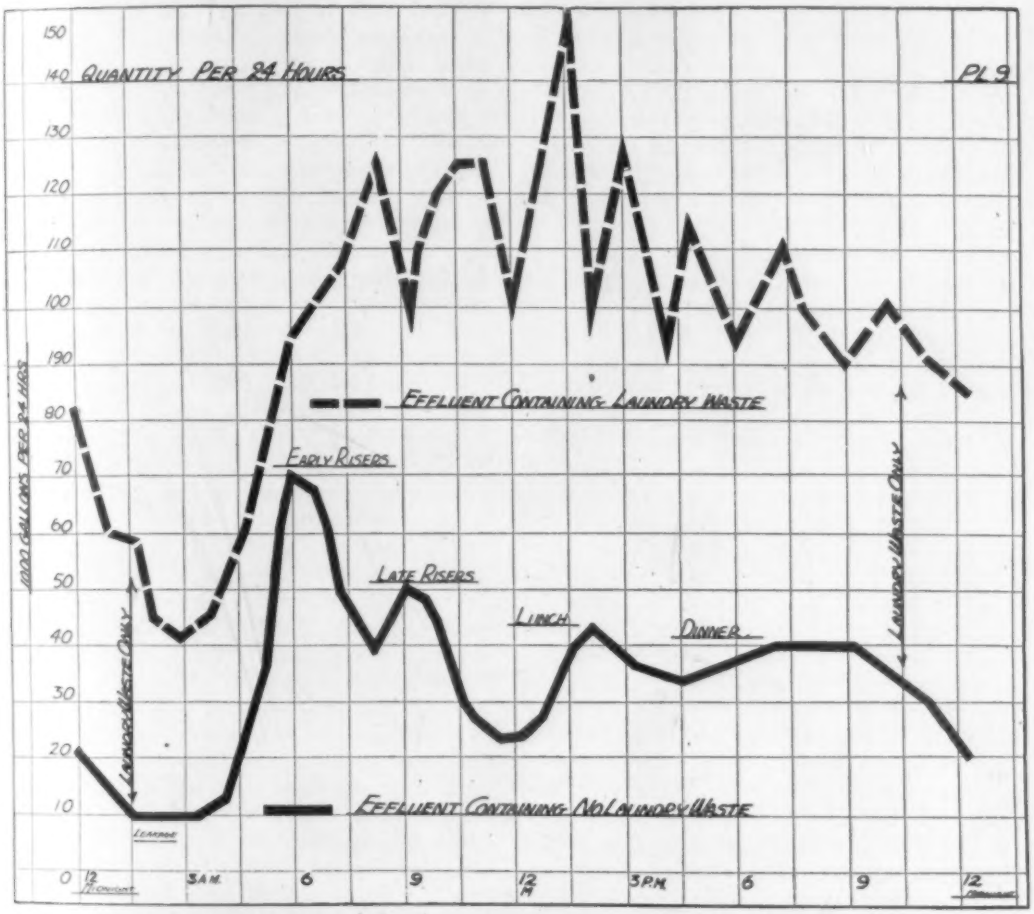
Some laundries make collections from a number of municipalities, and washing is continued throughout the week.

Difficulties at Oaklyn, N. J.

At Oaklyn, N. J., there was located such a laundry, and the effect of the wastes on the sewage treatment plant was remarkable. Oaklyn has an estimated population of 4,000, based on the number of sewer connections, and is in Camden County, about seven miles from Philadelphia. It is a characteristic suburban town having no industrial plants. The water-supply of the town is from deep wells and is 100 per cent metered, thereby keeping the sewage flow to a minimum and at the same time making it more concentrated. In 1915 a sewer system and sewage treatment plant were constructed, the effluent from which discharged into Peter's Creek, a tributary to Newton Lake, which is used for recreational purposes. The plant was designed for a flow of 168,000 gallons per day and consisted of course bar screens, Imhoff tank, dosing tank, sprinkling filter, final settling tank, chlorine dosing apparatus, and sludge drying beds.

For two years the plant delivered a satisfac-

tory effluent. In 1917 a wet-wash laundry was connected to the sewerage system, and the effluent from the plant in time began to show the effect of the wastes discharged from the laundry. This effect became more marked as the people in adjacent municipalities, principally on account of the high wage of the time, began to send their clothes to this laundry. Early in the summer of 1921 the Imhoff tank foamed violently, a condition which the designing engineer attributed to the laundry wastes. This condition was corrected after a number of experiments.



FLOW OF SEWAGE AT OAKLYN, N. J., WITH AND WITHOUT LAUNDRY WASTE

In the fall of 1921 a test was run on the sewage plant by representatives of the State Department of Health. At this time the laundry was operating only the first part of the week. During this period the sewage flow reached 150,000 gallons per 24 hours, while on Friday, Saturday and Sunday it dropped to 75,000 gallons. The difference between these two flows represented the volume of laundry wastes. A complete test of the plant was run from Monday to Wednesday. This test included the 24-hour composite samples of the raw sewage, tank effluent, sprinkling filter effluent, and final effluent. Catch samples for the determination of dissolved oxygen and 37° bacteria were taken from the effluent of each unit.

A careful study was made of the sprinkling filter, samples being taken of the effluent before the discharge of the siphon and every two minutes during one cycle. The effluent from the plant during this test was very cloudy and analyses indicated that very little purification was being obtained. Although the detention period in the Imhoff tanks was over three hours, the effluent was not satisfactory, as it contained 251 p.p.m. suspended material, much of which was finely divided colloidal material. The per cent removal of suspended matter was only 15. The sprinkling filter, despite its low rate of about 1¼ million gallons per acre per day and the fact that the dosing apparatus and nozzles were functioning properly, had very

little beneficial effect on the high oxygen demand of the 985 p.p.m. of total solids.

During the latter part of the week when the laundry was not operating, the test was repeated, and while the effluent gave a better appearance and the results of the analyses showed much improvement, the effect of the laundry wastes discharged into the plant during the first part of the week, was still noticeable. A 40 per cent removal of suspended matter was obtained in the Imhoff tank, while the sprinkling filters indicated a marked increase in nitrification. The amount of nitrates in the effluent was 3.8 p.p.m., while during the first part of the week the amount of nitrates was only 0.25 p.p.m. The average per cent removal of suspended solids by Imhoff tanks located in New Jersey is 60, and the average content of nitrates in a sprinkling filter effluent is 5 to 6 p.p.m.

As business grew, the laundry continued to operate a longer period until in 1925 they were operating every day in the week. About this time the borough of Oaklyn submitted plans for sewer extensions which would increase the flow of the sewage plant by 32,000 gallons. The authorities of the municipality were notified by the State Department of Health that these plans would not be approved inasmuch as the laundry wastes were interfering with the proper operation of the plant, based on the quality of effluent; that even though the laundry wastes were treated separately before discharging into the sewer system, the additional flow would overload the plant, based on quantity. It was recommended that the laundry wastes be given preliminary treatment before they were discharged into the sanitary sewer system, or that the laundry wastes be removed from the sewer system, treated separately and then discharged into the nearest stream. If the laundry wastes were treated in the latter manner, the sewage plant would be of a sufficient capacity to take the sewage flow from the proposed extensions. Inasmuch as there was a great demand for the sewer extensions, the local Board of Health and the Commissioners of Oaklyn passed resolutions on May 21, 1925, the substance of which was that the laundry wastes would be removed from the sewer system. The State Department of Health thereupon approved the addition of these extensions, with the following provisos:

1. That the removal of all laundry wastes, as covered by the resolutions adopted by the Commissioners of Oaklyn and the Board of Health of Oaklyn, on May 21, 1925, from the municipal sewage plant at Oaklyn, shall be completed before the sewer lines are used for the purpose of conveying domestic sewage.

2. That no laundry wastes should be allowed at any time hereafter to enter either the sewer lines or sewage treatment plant operated by the said Borough of Oaklyn, N. J.

These resolutions by the local authorities of Oaklyn were covered by local ordinances adopted according to certain laws of New Jersey by the Commissioners and the local Board of Health.

Having agreed to remove the laundry wastes, the municipal officials found themselves confronted with a very difficult problem. The Borough Solicitor advised that to order the laundry to discontinue the use of the sewer system would be dangerous, as they had certain rights in the matter which could not be overlooked. He further advised that a better way for everybody concerned would be for the laundry to install a preliminary treatment plant and discharge the effluent into the sewer system. The municipality was further advised by the State Department of Health that the quantity of these wastes would be such as to overload the sewage treatment plant, and their attention was called to their resolution in which they agreed to take the laundry wastes out of the sewage system.

In order to strengthen their case against the laundry, the municipal authorities consulted a commercial chemist, who collected samples and ran a test of the plant similar to the test made by the State Department of Health in 1921. This report of the chemist, so I am informed, fully upheld the findings of the State Department of Health. He concluded that the operation of the sewage treatment plant was being seriously handicapped by the laundry wastes. With their case thus strengthened, an agent of the municipality disconnected the laundry from the sewer system. Thereupon the laundry instituted proceedings against the municipality for damages. I was informed that a national laundry association prepared to back up the local laundry and sent an agent to Oaklyn to study the sittuation. The laundry prepared for a legal fight, and for a while the situation became a very interesting one. This was in 1925, but, to the best of my knowledge, the case has never been brought to trial.

Result of Removal of Laundry Wastes

After the laundry wastes were removed from the sewerage system an improvement in the effluent of the treatment plant was noticed and, on December 22, 1925, another test was made of the plant by representatives of the N. J. State Department of Health, the same program being followed as in the test of 1921. The flow at this time had practically reached the capacity of the plant. The analyses indi-

cated a marked improvement in the operation of the plant. The Imhoff tanks were removing about 70 per cent of the suspended matter. Nitrates, as found in the effluent of the sprinkling filter, averaged 16.5 p.p.m. The relative stability, by methylene blue, of the effluent from the plant, was found to be 90 per cent, and a 78 per cent reduction in the oxygen demand was being accomplished by the sprinkling filter.

I have attempted to show the specific danger of allowing untreated laundry wastes to discharge into the sewerage system, and some of the difficulties arriving from the necessity of shutting off a laundry after it has been connected with the system. If the laundry is already connected to the sewer system, the wastes should be treated at the laundry before they are discharged into the system. The method of purification will not be gone into in detail except to say that the New Jersey State Department of Health has found that the acid alum treatment produces a very satisfactory effluent.

The thought that I wish to leave is that the official must be on his guard against the discharge of excessive trade wastes into the sewer system. A municipality should have the proper ordinances drawn up and enforced. All applications for sewer connections from industrial plants should be carefully examined. The present connections from such sources should be studied and city officials should be informed as to the danger from the discharge of excessive industrial wastes. Few municipal authorities realize the danger, and it is the duty of the sewage works official to keep them informed.

I wish to acknowledge the assistance of F. E. Whitehead, Sanitary Chemist, Bureau of Engineering, in the analytical work accomplished in the field; E. M. App, Assistant Sanitary Engineer, for plotting the chart; and the Bureau of Chemistry for the analytical work accomplished in its laboratory.

ACKNOWLEDGMENT.—From a paper read before the New Jersey Sewage Works Association.

The Recent Typhoid Epidemic in Grafton, W. Va.

150
25 deaths

One Hundred and Fifty Cases with Twenty-five Deaths, Caused by Failure of Sterilizing Treatment

THE epidemic of typhoid fever at Grafton, W. Va., in December, 1926, and January, 1927, which resulted in 25 deaths from 150 cases, was directly due to the pollution of the public water-supply, according to a report received by the United States Public Health Service. Failure of chloride treatment of the water-supply, obtained from a mountain stream, due in part to trouble with the chloride apparatus, which was the sole safeguard of the water-supply, is described as the cause of the pollution of Grafton's drinking-water.

Accompanying the typhoid infection, which was unusually virulent for a water-borne infection, as indicated by the proportion of deaths to the number of cases, there occurred a large number of cases of intestinal disorders of five or six days' duration. Case data, gathered by personal visits to physicians, directed the attention of the engineers who conducted the investigation to the city water-supply, since the cases were distributed throughout the town wherever the city water-mains ran and no other common food or milk supply was found.

False Economy

A typhoid epidemic, costing 25 deaths and 150 cases of sickness, not to mention the anguish and suffering, is rather costly economy. The economic loss to Grafton due to this outbreak of water-borne typhoid fever cost the community close to $200,000, figuring life and loss of health conservatively.

Water Supply

Grafton obtains its water-supply from a mountain stream, the Tygarts Valley River. Five years previously the State Health Department, in cooperation with the city authorities and the Chamber of Commerce, had staged an intensive educational campaign on the need of water filtration for Grafton. The bond issue was defeated, however, and the only protection which the State Health Department could secure, was chlorine disinfection. It was almost necessary to have recourse to the courts to obtain the installation of the chlorinator.

On December 28, 1926, the sanitary engineers visited the pump-station and found chlorination being practiced, but at a low rate of dosage. The river was very high and

muddy, as had been the case during November and December, because of an abnormally high rainfall rate. The chlorinator was partially crippled and the test showed no residual chlorine in the treated water at the pump-station.

The rate of dosage was immediately raised to 15 pounds per 24 hours to treat two million gallons of water pumped daily. The rate of dosage was increased at 9 A. M. and by noon a marked residual chloride test was obtained in the city mains several miles away in Grafton.

Further investigation disclosed the fact that the chlorine apparatus, the sole safeguard of the supply, had been giving trouble during the preceding month and had been shut down for repairs, and treatment of the water-supply had not been continuous nor at a high enough rate of dosage. The full-time city and county health officer had during his term of office carefully watched the water-supply, sent samples regularly to the State Laboratory for bacteriological tests, and checked up consistently on the chlorine treatment.

The full-time health work had been discontinued by the County Court as an economy measure some months previous to this epidemic. Consequently, the careful supervision of the water-supply, requiring the Water Department to treat it regularly with chloride, was neglected.

Watershed Conditions

The facts as to specific pollution on the watershed of the river above the Grafton water intake were investigated. Dr. C. B. Williams, County Health Officer of the adjoining county, reported that he had had five cases of typhoid fever at Philippi, thirty miles upstream, in the late fall, and that in Arden, twenty miles upstream from Grafton, eight or ten virulent typhoid cases had been reported to him during October and November, 1926.

Two young men had died of typhoid fever at Arden. No care was taken in disposing of the stools of typhoid patients at Arden. They had been thrown out on the banks of a small stream leading to the river.

Examination of the rainfall records of the Government Weather Bureau station at Elkins, nearby, indicated that heavy rains had occurred during the second and third weeks of November, a period preceding the time of development of the greatest number of typhoid cases in Grafton by two or three weeks. The picture is therefore complete for a water-borne typhoid outbreak.

The Tygarts Valley River rose during the latter part of November, 1926, bringing the typhoid discharges at Arden direct to the Grafton water-supply intake. The disease-laden water, without disinfection, or with incomplete treatment, went directly into the Grafton mains and caused typhoid fever in every area in Grafton served by the mains.

Preventive Measures

The preventive measures adopted included the following:

1. Free typhoid inoculation was offered to all school children of Grafton by the school authorities and was given systematically in daily scheduled clinics.

2. Repairs to the chlorinating apparatus were made so that the amount of chlorine being fed could be observed directly by the pump-station operator.

3. The rate of chlorine treatment was increased and records were kept by hourly observation of the amounts of chlorine used and tests for residual chlorine were made on the water in the city mains.

4. Immediate steps were taken to retain a competent water-works engineer to draw up plans for a modern filtration plant, and the State Legislature was asked to pass a special emergency bill, allowing a special levy to be laid by the city authorities to finance the construction program.

5. As Grafton is a railroad water-supply point for water used on the Baltimore and Ohio Railroad for drinking purposes on trains in interstate traffic, special emphasis was laid on the safeguarding of this water-supply. The system used by the railroad consisted of double filtration of the city water through two pressure filters. The State Health Department required an additional chlorinating apparatus to be installed on this railroad water-supply after it passed the pressure filters, and the keeping of daily reports on filter and chlorinator operation, together with residual tests for chlorine. Good cooperation was secured from the Baltimore and Ohio Railroad in this respect.

6. Furthermore, the Department urged that the city and county reestablish the full-time health unit which had done such good and effective work in the past and had been discontinued because of the desire for economy.

"All men are created free and equal," not free to exercise unbridled liberty, but free to do right; not equal in endowment or attainment, but equal under the law."—*Civic Club of Philadelphia*

Location, Size, and Layout of Airports

By George B. Ford

NOW that there is so much agitation about municipal airports, many people are wondering where an airport should be located, how large it should be and how it should be laid out.

In the first place, experience everywhere shows that an airfield of any importance must be on a large open tract of ground—the more nearly level, consistent with proper drainage, the better; unobstructed by buildings, wires, trees, rocks, marshes or water courses. Careful attention should be given to the surroundings of a proposed field to make sure that there neither are, nor are likely to be, high structures or even high trees or wires that would hamper low access in landing or create freak or gusty air currents. Then, too, the noise of many airplanes might be most disturbing to a bordering residential district. The ideal environment is farm land, country clubs, playfields, cemeteries or bodies of water. The latter are highly desirable as they permit the access of amphibian planes.

The field not only must not be marshy, but it must provide good foundations for buildings and for runways. Any site where fogs or mists or bad winds are prevalent is, of course, undesirable. In general the field must be readily accessible by motor, bus or trolley from the center of the city or town, and it should have possible rail connection. It should be possible to reach it from the near-by airways without having to pass over the city or over a long stretch of water.

How large should a field be? Of course, if the helicopter principle is worked out practically, machines will be able to rise from a city lot or the roof of a house; but assuming that there will always be planes that will take off by running along the ground the way a bird does, every field that is going to be generally useful must be large enough in all directions to take care of even the heaviest freight planes or airliners.

The use of practical retarding devices may make it possible to stop an ordinary plane in almost as short a distance as one can stop an automobile from the same speed, so that even the largest airplanes thus equipped may eventually be able to land in a field a few hundred feet square provided there are no buildings, trees or wires around the edge which prevent low access to the field. However, the problem of taking off is not so easy. A special incline to give initial speed, such as that used by trans-Atlantic fliers at Roosevelt Field, or a catapult, such as is used on ships in the Navy, is hardly practicable in an airport where ships are constantly coming and going and must always rise into the wind regardless of the direction from which it is blowing. True, some planes can rise in about 100-yard runs, but the trans-Atlantic fliers required over 3,000 feet of ground. So far as it is possible to foresee the future today, no field should be much less than 1,800 to 2,000 feet in each direction—and, preferably, 3,000 or more, especially in higher altitudes—and in any case at the end of the take-off neighboring buildings and trees should be low enough not to interfere with a rise of one foot in seven.

As the machine does not have to rise directly into the wind, and as it is quite practicable to rise 45 degrees away from the wind, the field does not have to be square; in fact, it can, if necessary, be L-shaped or T-shaped, provided there is a full-length runway available in each of two directions at approximately right angles with each other. Hard-surfaced flush runways, at least 100 feet wide and 100 feet clear of any

Profiting by the Experience of the War Department

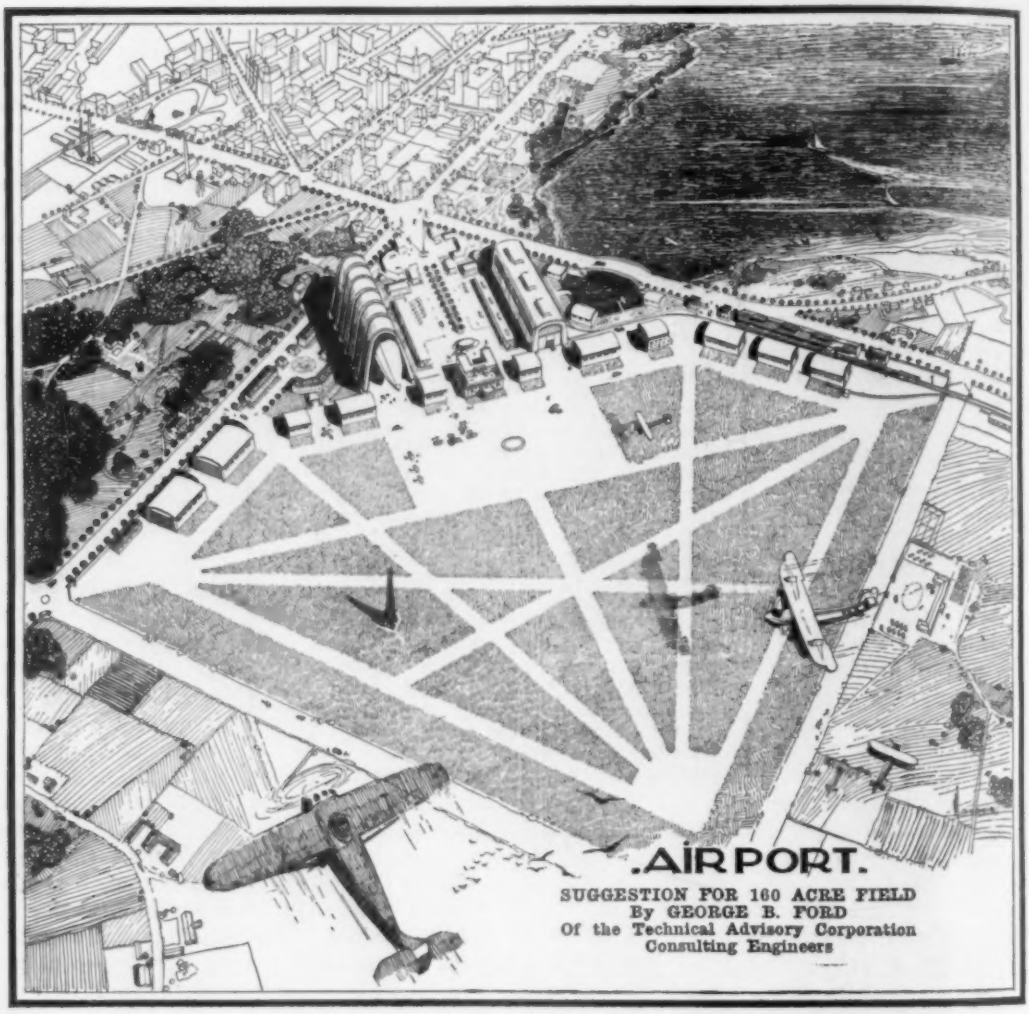
As part of his regular professional city planning activities as Vice-President of the Technical Advisory Corporation, of New York, the author of this article has been serving for some time past as City Planning Adviser to the War Department. In this capacity Mr. Ford has recently been called to advise with military officials concerning airfield layouts.

Since the Army has thus far had more experience with airport problems than any other group, and as Mr. Ford has also aided in choosing airfield sites for various cities in connection with their city plans, he has written the accompanying article to give to readers of The American City the benefit of his experience, which may help in solving some of the problems that municipalities and chambers of commerce are now facing in putting their respective cities on the airline.

obstructions, should be built at right angles to each other if the surface of the field is too soft.

Hydroplanes and amphibian planes can use a body of water only 3,000 feet square, but a minimum of 4,000 to 5,000 feet square is most desirable.

worse yet, in dry seasons the dust or sand would be blown in by the wind or by propellers from the field into the hangars and get into the machinery of the planes with disastrous results. Today the new fields are being laid out with the hangar line parallel with the predominating wind, so that an airplane can come out of the



Airships can land and take off in any field large enough for heavy airplanes, provided there are at least 2,500 feet clear opposite each open end of the hangar.

The location of the buildings on the field is different today than it was a few years ago. They used to locate the hangar line facing the prevailing breeze. They found, however, that the strength of the prevailing winds often made it very difficult to open or close the hangar doors and manoeuvre the planes in or out; but, hangar, taxi up the runway along the front of the "line," and rise into the air at one end of the line and light at the other.

The hangar line should be used for hangars, and hangars only, except that all gasoline supply tanks should be so located that airplane tanks can be filled from the runway; and the administration and operations building, with ticket office, waiting room, post-office and customs, should be located near the center of the hangar line and slightly in advance of it, so

that the controlling operator can keep an eye not only on the field but also on all planes entering or leaving the hangars.

Types and Location of Hangars

As it is desirable to have the roofs of the hangars as low as possible next to the field, and as it is useful to be able to take airplanes in or out of the hangars in an area sheltered from the wind and dust, it is preferable to have the hangars side on to the field and open at both ends into a common hard-surfaced space about 100 feet wide between each two hangars. This makes it possible to use each hangar to capacity and to have not more than one plane behind another at each end of the hangar. In practice these hangars vary from 60 to 120 feet wide and from about 100 to 250 feet long, depending on the size of the planes which they are expected to house. Most planes can be put comfortably in a shed 60 to 75 feet wide, although some of the newest planes with about 100 feet spread obviously demand larger hangars.

A proposed type of hangar is about 180 feet wide by 300 feet long, with doors continuously all along each of the 300-foot sides, with the roof supports so spaced that any plane from the smallest to the largest can be easily warped into the hangar. Along the middle of the length there is a double row of columns about 20 feet apart, the space between the two rows being used for service and supplies. One great objection to this new type is that the height of the roof and especially the peak on the side facing the field can seriously interfere with low access to the field.

An airship hangar would be from 600 to 1,100 feet long and from 100 to 200 feet wide and high, with at least one end, and preferably two, opening directly on the field. Amphibian plane hangars could be somewhat lower than airplane hangars and open directly on the water with an incline.

Auxiliary Buildings

The various service auxiliaries, such as the meteorological station, the radio hut, the photographic laboratory, the fire house, the hospital, the assembly shop, the motor repair shops and the test blocks, should all be placed just back of the line and behind the hangars, but so located that there can be direct access from them to the field between hangars. The assembly shop is the only one of these buildings to which airplanes would have to have access. Therefore, a direct hard-surfaced runway to it is necessary. Obviously the motor repair shop and test blocks should be immediately adjacent to the assembly shop.

Finally, with or behind the secondary services adequate space should be provided for housing the personnel and for shops, club buildings, equipment, warehousing, restaurant service, hotel, etc. All should be well isolated to prevent conflagration.

Selecting the Airport Site

In general, a quarter section, or 160 acres, is a good minimum size for an all-round airport, although if the field is made L-shaped or T-shaped, even this acreage can be reduced somewhat. However, if it is practicable at reasonable cost to increase the acreage anywhere up to a square mile, with 3,000- to 5,000-foot runways in each direction, it is certainly worth doing. The aspect of the field from the air is also most important. To the traveler of the future his view of the airport as he alights will be his first impression of the city. No city can afford to neglect its air "mosaic," especially at the new city gateway.

With the great enthusiasm for aviation, which has followed Lindbergh's flight, many communities are going to develop airports and then be greatly disappointed for a number of years because the field is so little used. However, around most cities there is only a very limited number of sites that are really desirable as airfields or that can be made practicable except at prohibitive expense. Therefore, it is most important that every city, as a part of its city plan, should determine early the most desirable sites and do everything possible to reserve them for eventual airfield use by making sure that no costly construction is placed upon them or near them that would eventually have to be removed when the field is wholly needed for aviation. Of course buildings need be constructed only as fast as needed. Unless, however, a general layout plan is made before any permanent buildings are erected, they are quite likely to have to be relocated as the airport grows.

Other articles in this issue, having to do with airports and aviation, are to be found on pages 393 and 309; they are entitled, respectively, "Department of Commerce Predicts 1000 Airports and Intermediate Landing Fields by End of 1927," and "Airmarking for Cities."

FIG. 1.—CARNEGIE AVENUE AND EAST 89TH STREET, CLEVELAND

Traffic Signalling in Cleveland

Practically Continuous Operation of Automobiles at 25 Miles Per Hour—Traffic Officers Released for Other Duties

By Edward J. Donahue
Commissioner of Traffic, Cleveland, Ohio

ABOUT three years ago it became very evident to the City of Cleveland that traffic congestion was increasing so rapidly as to constitute a most extensive menace to the growth and prosperity of the city. Immediate steps for relief were necessary. The burden fell on the Traffic Division of the Police Department which, with the cooperation of the Cleveland Automobile Club, undertook a careful study of the problem and the methods of its solution.

Analyzing the Problem

The first step was to analyze carefully the miscellaneous traffic surveys which had been made over a period of years by different civic organizations, newspapers and city departments. Officials of the City and of the Cleveland Automobile Club traveled four thousand miles, visiting various cities and studying their traffic conditions. Conditions in Cleveland were found to be unlike those in any other city. This study, however, enabled a definite set of recommendations to be drawn up.

Traffic officers were being used at a great many intersections of important thoroughfares throughout the city; many of these were in outlying sections. It was realized that over one hundred additional officers were needed immediately, unless some other method could be worked out for meeting the traffic conditions.

Automatic and Manual Traffic Signal Control

By the installation of automatic traffic signals it was estimated that no additional traffic officers would be required, and that those now on duty at many posts would be released for patrolling and other duties. After careful study of the different types of signals, it was determined that a maximum benefit could be obtained with a limited amount of money by adopting a standard type of signal light, suspended by cable at the center of an intersection, with red, green and amber lights fac-

ing traffic in four directions. During the year 1926 over one hundred signals of this type were installed at various important intersections throughout the City, each operating from its own automatic control. This control is illustrated in Fig. 2.

The control adopted as standard is equipped with independent dials for the adjustment of the green, amber and red periods. These dials are calibrated in seconds, making it very easy for an officer to make changes in settings as required. Each intersection can be easily timed for whatever traffic conditions may exist. The control requires no particular leveling, or care, in installation; it is not affected by extremes of temperature and, when installed, is provided with lubrication sufficient for two to five years of continuous operation.

An auxiliary manual control switch is provided for manual control of the signal under emergency conditions, such as street demonstrations, the moving of fire-fighting equipment, accidents or other unusual occurrences which may obstruct or offset the normal flow of traffic.

FIG. 2.—AUTOMATIC AND MANUAL TRAFFIC SIGNAL CONTROL

FIG. 3.—CHRONOLIZER

The Problem on Carnegie Avenue

After relief was obtained at over one hundred isolated intersections, the problem of controlling traffic on Carnegie Avenue was undertaken. Carnegie Avenue is a main artery of travel approximately four miles long; it extends from the congested business section of the city to the outlying residential district. Traffic consists almost entirely of passenger cars; slow-moving trucks are diverted to parallel streets. Cross traffic at the different intersections varies in amount from a large volume on East 55th Street, approximately equal to that on Carnegie Avenue, to a very small amount on some of the other cross streets.

Before the installation of a signal system on Carnegie Avenue, traffic was controlled by hand-operated semaphores at twelve of the more important intersections. Each officer controlled his intersection as seemed best. Between the intersections at which traffic officers were stationed motorists drove at high speed, without regard for vehicular or pedestrian traffic. Pedestrians at these uncontrolled intersections often complained that it was necessary for them to wait from five to ten minutes for an opportunity to cross. Motorists complained of the frequent stops they had to make and of the time lost at the intersections where traffic officers were located.

Excessive speeds of automobiles between intersections at which officers were stationed created a dangerous condition and much of the time thus gained was lost by stopping at the various intersections; it was frequently necessary to stop as many as twelve times in traveling the four miles. Motorists were persistently demanding a system which would permit them to run at a reasonable speed without being frequently stopped.

As the opposition to frequent stopping was already great, a synchronized signal system, in which all signals give a "GO" indication at the same time, followed by a period in which all signals give a "STOP" indication, was out of the question. A trial installation of this type of system had been in service on Euclid Avenue and had been found to materially slow up traffic movement in general.

Providing a Uniform Traffic Flow at Maximum Street Capacity

It was then suggested that continuous movement of traffic could be obtained by operating

all signals from one control, alternating the indications in groups. Owing to the great variation in the length of blocks, and also because of the variation in traffic at different intersections, it was decided that such a system would fall far short of providing maximum street capacity, since it would be necessary to give periods of equal length to all cross streets, holding up main traffic at a great many intersections for long periods when there was no cross traffic. To provide uniform traffic flow and maximum street capacity, it was found necessary to provide individual adjustment for each intersection and, in addition, to maintain a definite time relation between signal indications at the different intersections.

A central control was suggested with four conductors to each signal, but the cost of such a control and cable installation was prohibitive. The Tokheim Chronoplan system, furnished by the Tokheim Oil Tank and Pump Company of Fort Wayne, Ind., was finally decided upon. Complete flexibility is provided, permitting the timing at each intersection to be adjusted to suit the traffic conditions at the intersection and also maintaining a definite time relation between all intersections. This system uses the same control units as have been adopted by the city of Cleveland as standard for their isolated intersections. Cable cost in this system is cut to the minimum, complete flexibility being obtained by the use of three small interconnecting wires.

The width of Carnegie Avenue permits four lanes of traffic. In the morning rush hour three lanes are occupied by the traffic moving toward the business section of the City. During the evening rush, three lanes are given over to traffic moving toward the residential districts. Between morning and evening rush hours, when traffic is approximately uniform in both directions, two lanes are given to traffic moving in each direction.

As the name implies, the Chronoplan system is a timed plan system in which the timing of all signals has been carefully planned.

How the Relative Timing of Signals Was Worked Out

Figure 4 is a graphic chart showing the method by which the relative timing of all signals was worked out to give theoretically continuous traffic movement in both directions on Carnegie Avenue at a uniform speed of twenty-five miles per hour. Distances between streets are laid off on the vertical scale and time in seconds is laid off on the horizontal scale. The heavy horizontal lines represent the relative time and length of the "GO" periods on Carnegie Avenue at the cross streets, as indicated on the left margin. The two light lines, sloping up to the right, represent the first and last cars, respectively, of a group going east on Carnegie Avenue at a uniform speed of twenty-five miles per hour. The space between the two sloping lines represents the size of the group of cars. The two light lines, sloping down to the right, represent a similar group of cars going west on Carnegie Avenue.

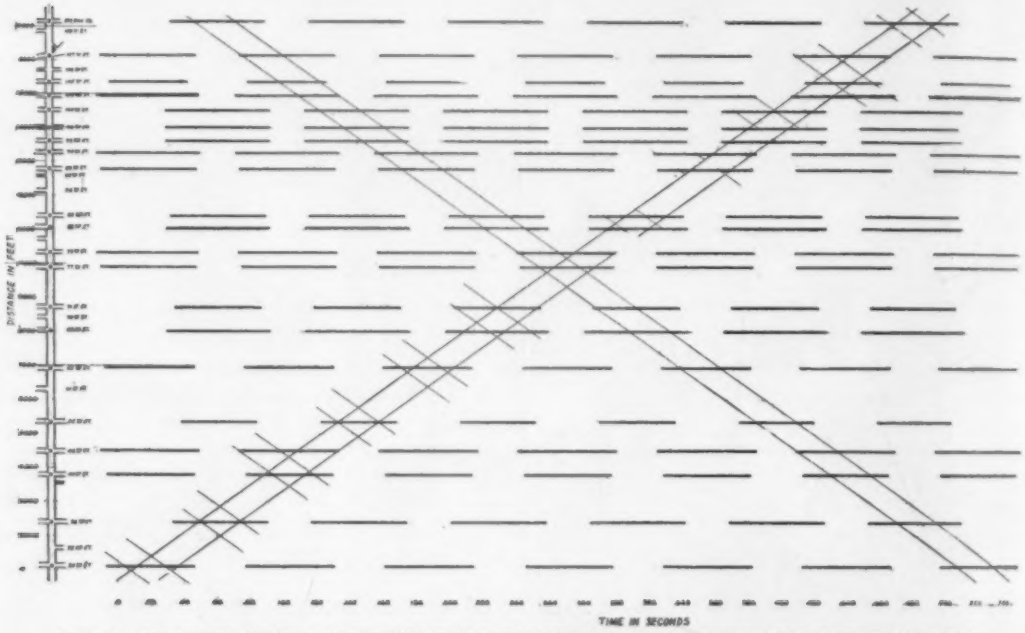


FIG. 4.—GRAPHIC CHART, SHOWING RELATIVE TIMING OF SIGNALS ON CARNEGIE AVENUE

For convenience in showing the arrival at each intersection of the two groups of cars, moving east and west, short sections of lines, representing different groups of cars going west, have been drawn crossing the lines representing a group of cars going east. Because of the unusual varying lengths of blocks, groups of cars moving east and west on the main artery at uniform speed cannot be made to arrive at each cross street at the same time. To make each group of cars as large as possible, the "GO" periods have been lengthened at a number of streets to allow groups of cars arriving at somewhat different times to cross in the same "GO" period. Timing has been so worked out that cross streets have been favored in proportion to their traffic. All time not necessary for cross traffic at any intersection has been given to Carnegie Avenue.

Provision has been made for the motorist on the avenue, the motorist on cross streets, street cars crossing the avenue and pedestrians moving on or across the avenue. The timing of the signals has been so arranged that traffic moves substantially without interruption at uniform speed. The timing on the main and cross streets is so arranged that groups of cars, or waves of traffic, as they are frequently called, arrive at intersections during alternate periods in the cycle.

The "Chronolizer"

A device known as the "Chronolizer," as shown in Fig. 3, is located at 55th Street. This device not only holds all signals in step, but will automatically reset to the predetermined time relation any signals that may be temporarily cut off, either intentionally or by accident. In addition to giving the total cycle the proper division of time at each intersection, the different periods at each intersection may be set to begin at any desired time relative to each other. This provides a system of maximum flexibility upon which any timing plan may be set by simple adjustments of the controls and without changing any parts. The system on Carnegie Avenue is so adjusted that traffic at a speed of 25 miles per hour can move in both directions without interruption. By a simple adjustment of the Chronolizer a greater or less speed can be provided for.

The Chronoplan system can be extended onto streets intersecting Carnegie Avenue, so that traffic will be divided into groups which will cross that avenue at the proper interval in a minimum of time. Cedar Avenue at 55th and 105th Streets is now hooked up with the Carnegie Avenue system.

When Motorists Get Out of Step

If a motorist exceeds a speed of 25 miles per hour, he will get out of step with the system and be stopped by a red signal. If the motorist runs at a speed less than 25 miles per hour, he will also get out of step with the system and be stopped by a red light. The green periods, however, are held long enough so that if the motorist is forced to slow down for a short time he still has an opportunity to speed up, gaining the lost time and thus keeping in step with the system.

The time given to the various cross streets is in proportion to the traffic on these streets. At streets like 55th Street and 105th Street, where cross traffic is heavy, a longer cross period is given. Traffic is so grouped on Carnegie Avenue that it arrives from both directions at the same time at these important intersections, thus requiring a minimum of time to cross.

The operation of the Chronoplan system on Carnegie Avenue has enabled motorists to travel a distance of approximately 4 miles, covered by the system, in an average time of 10 minutes, whereas, when controlled by manual semaphores, the average running time was 21 minutes.

As the majority of traffic on Carnegie Avenue consists of passenger automobiles, the system was timed to suit this traffic, and it was not expected to be entirely favorable to busses, due to the frequency of their stops. The actual operation of the system, however, has shown that busses still maintain their former schedules; in fact it is found that the busses keep in step with the signals at 25 miles per hour the greater portion of the time they are on Carnegie Avenue, for the reason that the drivers are expert in getting away after making a stop and speed up to overcome the time lost in making the stop, thus catching up with the "wave" of traffic in which they were traveling before the stop had been made. It is true that a motorist in some cases may be stopped by red lights; this, however, is not the fault of the system, but is because the proper speed has not been maintained, owing to the motorist's manner of driving, or his being obstructed by another motorist who is not maintaining the proper speed.

As the traffic is divided into groups, pedestrians are given ample opportunity to cross. Cars entering Carnegie Avenue from side streets, garages, or alleys, or parked cars pulling away from the curb, are all given a chance to get onto Carnegie Avenue between the groups of traffic.

Each intersection is equipped with a manual

switch by means of which the signal may be operated manually in case of emergency or any unusual traffic conditions. Manual operation of one or more signals does not interfere with the automatic operation of the remainder of the system.

Extension of the System to the Business Section in Cleveland

Because of the success of the Chronoplan system on Carnegie Avenue, it has been extended to the business section of the city, replacing a synchronized system of nine intersections on Euclid Avenue, between the Public Square and East 18th Street, and four intersections on Prospect Avenue. Signals have been timed for continuous movement of traffic on both north-and-south and east-and-west streets. Since this change it has been possible to reduce street-car schedules five minutes each way through a distance of a little less than a mile on Euclid Avenue. As each signal is independently timed, the excessive power load of a large number of street cars starting at once is relieved, which is impossible when signals operate from one control. Because of the very marked improvement in traffic since the installation of this system in the congested business district, twenty-one additional intersections are to be tied into the system just as soon as the work can be completed.

The system adopted can be easily extended throughout the city without increasing the size of any existing conductors or obsoleting any existing equipment. The system as adopted by the city of Cleveland has been installed at approximately one-fourth of the cost of systems accomplishing the same results as reported from certain other cities.

Traffic Officers Made Available for Other Duties

When the installation of automatic traffic controls was first considered, it was felt by those who had studied the Cleveland problem from all angles, that the time had come when a halt should be called to the number of fatalities occurring in the ranks of our traffic policemen. Too frequently men were being killed and injured at their dangerous posts of duty in the centers of busy street intersections. With the successful operation of automatic signals, fully 150 traffic officers were taken from the centers of street intersections and made available for other duties where they were urgently needed, as are still more. The combined yearly salaries of these policemen amount to over $300,000, which could very properly be credited to the installation of automatic traffic signals, and which amount represents several times the entire cost of Cleveland's traffic signal equipment to date.

Low Infant Mortality Rates of Pacific Coast Cities

PACIFIC COAST cities continue to lead the country in low infant mortality rates. Portland held first place among the largest cities of the country (those over 250,000) during 1926 with a new low rate of 39; Seattle ranked second with 47; and San Francisco third with 50. Oregon, Washington and California rank in the same order when the rates of all of their cities reporting are considered. The thirty-eight cities of over 10,000 population in the Pacific Coast group established a combined rate of 54 in 1926, which represented a decline of eight points during the last four years. Berkeley and Pasadena, Calif., ranked second and third among the cities of from 25,000 to 100,000 population, reporting rates of 36 and 37 respectively. The lowest record for any city over 25,000 population was that of Oak Park, Ill., 35. Everett, Mass., was fourth among the cities with populations 25,000 to 100,000, with a record of 39. The three lowest cities in the population group of 100,000 to 250,000 (1920 census) were New Haven, Conn., 54; St. Paul, Minn., and Cambridge, Mass., each with a rate of 56.

These figures, representing the number of deaths under one year per 1,000 live births, are taken from the eighth annual report of the American Child Health Association, and are based on preliminary records of the United States Census Bureau supplemented by reports of state and local officials. The report presents infant mortality rates for 613 of the cites in the United States Birth and Death Registration Areas, and 62 cities in the Death Registration Area only, and yields the following important facts:

Four hundred and eighty-five (or 79%) of the 613 cities reporting from the Birth and Death Registration Areas, and 34 (55%) of the 62 cities of the Death Registration Area, have infant mortality rates between 50 and 99.

The infant mortality rate for 1926 in 613 of the 644 cities of the Birth Registration Area is 73.7. This represents an increase instead of a reduction over 1925, when the rate for 632 cities was 72.6. The lowest rate so far attained was 72.2 for 629 cities in 1924.

The median infant mortality rate for the urban population of states of the Birth Registration Area reporting was 77. The lowest urban rate for states of the Birth Registration Area reporting was 39, the highest 111.

The annual reports on infant mortality in cities of the United States have been issued by the Child Health Association since 1919 with the object of interesting the entire country in the reduction of child deaths and the necessity for complete birth registration. In 1926 there were but 35 of the 48 states and the District of Columbia whose records were of sufficient accuracy to admit them to the Birth Registration Area. The Association strongly supports the Government's efforts to have the entire country within the Birth Registration Area by 1930.

Calcium Chloride as a Dust-Layer and Ice-Remover

By Alfred J. Paul

Street Commissioner, Ann Arbor, Mich.

FOR a period of six or seven years, it has been the practice in Ann Arbor, Mich., to use calcium chloride for laying the dust on dirt streets. Last season the City Council passed a resolution making it possible to lay the dust on all dirt streets in the city, there being some seventy-odd miles of this type of streets. The total expense for laying the dust on these streets is $22,326.41. The same streets are being treated this year, and the taxpayers are very well satisfied with the results.

In the winter when the streets become very slippery, we have been using sand, which is spread lightly over hilly streets, sharp curves and "stop" streets. A year ago last winter we had quite a little Dowflake calcium chloride in our storehouse, and during the winter there came a time when it was impossible for us to get sand to use on the icy streets, so we decided to try calcium chloride. Our experience was very satisfactory. It is more expensive than using sand, but it does not require so many applications. One application under certain conditions will take care of two or three snowfalls. Sand, of course, answers the purpose very well in cold weather, but on days when it thaws during the day and freezes over night, sand is not so lasting, as it will freeze over and the streets will be just as slippery as they were before the sand was applied. Calcium chloride will continue to keep the ice melted until it is washed away.

Airmarking for Cities

WITH air travel developing ever more rapidly than the installation of aids to navigation, the marking of cities becomes, without doubt, the most immediate important aid.

Much of the country remains to be covered by air maps, and even with these it is, at times, necessary to check locations.

The Department of Commerce, in a statement issued last month, urges signposting the roofs of prominent buildings everywhere in the United States in the following manner:

How to Mark

The roofs selected should be of tile, shingle, tin or other metal, or of slate. Gravel and pitch roofs should be avoided, if possible.

A simple block letter in chrome yellow with a dull black background should be used. If the roof has a slope of over 30 degrees, the sign should be painted on both sides.

The width of letters such as "M" or "W" should equal two-thirds their height—other letters in proportion. A spacing of one-fourth the height should be used between letters. Letters should be not less than 6 feet in height—preferably as large as possible. Letters less than this minimum cannot be seen at a considerable height.

Where gravel or pitch roofs offer the best location, wooden letters may be elevated above the roof or the sign may be painted on a dull black background formed of wood raised on legs above the roof proper.

The name of the city should be used, with an arrow pointing in the direction of the city's airport, thus: *

Where raised letters alone are used, the gravel roof beneath should be so treated as to give a darker ground than the gray of the gravel.

Lighting

It is of primary importance that these names be illuminated at night. Ordinary flood lights may be employed, the number depending on the area to be illuminated and type of flood-light used.

Airway Bulletins

Advice of such air marks, with location, should be sent Aeronautics Branch, Department of Commerce, for inclusion in its Airway Bulletins or other notices to pilots.

* The lettering shown, prepared by THE AMERICAN CITY to conform with the specifications given, has been approved by Ernest Jones, Chief of the Air Information Division of the Department of Commerce.

The Secretary of Commerce, Herbert Hoover, in a recent letter addressed to the governors of all the states, says:

"It has been brought to my attention that painting of the city's name on the highest buildings of the respective towns in your State would be a distinct advantage to both the military and commercial air pilots.

"May I urge that you bring the matter to the attention of the individual Chambers of Commerce in your State, each chamber, in turn, to take it up with the business organizations in the community."

City Hall Park, New York, As It Now Is

The Front Cover Illustration of This Issue Shows the Park as It May Look Some Day

AIRPLANE VIEW ACROSS CITY HALL PARK, NEW YORK, LOOKING WESTERLY TOWARDS THE HUDSON RIVER

IN the etching by Anton Schutz which forms the front cover illustration of this issue of THE AMERICAN CITY, the artist visualizes the appearance of City Hall Park, New York, if and when Congress shall have acted favorably on the increasingly insistent demand for the removal of the old downtown Post Office to another site.

The present appearance of City Hall Park, amidst the over-shadowing mass of bordering sky-scrapers, is shown in the airplane view here reproduced. The fine old City Hall and the comparatively new Municipal Building will be recognized in and near the northern end of the park (towards the right and near the bottom of the picture). The Post Office occupies the southern apex of the triangle—land once part of the park and still owned by the City of New York.

Northeast of the Municipal Building, but not shown in the picture, is the fine new Court House, octagon in shape. Its row of Corinthian columns has a noble dignity which is not great enough, however, to keep the eye from observing the ignoble structures and streets nearby. Ugliest of all is the antiquated building occupied by the Department of Health. Perhaps some day the greatest city in the world will house its health board in a worthy structure as part of a really adequate Civic Center!

LOCAL SYNDICATE ABSORBS MILLION-DOLLAR BOND ISSUE IN A SMALL CITY

It is not always that a city of 30,000 has a bank with enough money and public spirit combined to buy a million-dollar bond issue. The City of High Point, N. C., has recently sold an issue of bonds for funding purposes, amounting to $1,000,000. A syndicate headed by one of High Point's banks, the Commercial National Bank, bid this in at five per cent plus a bonus of $20,770, which is a better price than any out of town competitor offered. This is a very creditable achievement for a bank in a city of this size. Also, it is worth mentioning that this same bank has bought other bonds issued by the city in past years.

P. P. PILCHER, City Manager.

Budgeting the City Plan by a Long-Time Financial Program

CITIES are confronted with two distinct conflicting popular demands: one, for more and better services and physicial facilities; and the other, for relief from taxation and the costs of government. These opposing attitudes constitute a problem which, in some way, must be solved.

Pointing out this need, C. E. Rightor, Chief Accountant of the Detroit Bureau of Governmental Research, and Secretary of the Mayor's Committee on Finances, City of Detroit, offers in a 28-page monograph to be published this month by the Municipal Administration Service (261 Broadway, New York), the most comprehensive guide to procedure in the formulation of long-term financial programs which has yet appeared.

The experiences in finance planning of such cities as Minneapolis, Newark, Kalamazoo, St. Louis, San Francisco City, Buffalo, Cincinnati, Los Angeles and Detroit, are outlined. These suggest the need of preliminary decision upon a number of phases of long-term improvement planning, and the author continues:

Stabilizing a City's Economic Situation

In the forthcoming monograph by C. E. Rightor, on which the accompanying article is based, the author says:

"During recent years the budget features of planning and financial control have been extended to capital expenditures. It has been found that the development of public improvements giving consideration to both the physical and economic well-being of the city requires long-term financing. A city plan, to be most effective, requires a sound economic basis for its execution. Such long-term planning will require that every improvement be considered, and that each be acquired in the order of its relative necessity to the community. With such complete plan, the general welfare of the city is assured of receiving primary consideration, while the pet schemes of influential individuals or groups, presented at an unguarded moment, are subordinated to the general plan.

"Furthermore, the carrying out of a broad general plan of improvements has a tendency to stabilize the economic situation. With a definite program for completing public improvements, as to the time both of acquiring and of financing them, the tax burden may be fairly well equalized over the period. This result is of substantial advantage to industry, merchants and home-owners. Leases, which are of growing importance in real estate transactions in our cities, may be more safely entered into by both parties to the transaction, as the tax demands may be more definitely anticipated."

Organization for Preparation of Program

"Some action must be taken to determine the agency by whom the program shall be prepared. Shall it be an official or non-official agency? If official, shall it be selected by the executive or by the legislative body? Shall it be an individual or a group? Shall it be a temporary or permanent organization? And shall it be salaried or non-salaried? These are questions to be answered, it may be assumed, largely as the local circumstances dictate. Yet there are certain general principles suggesting a desirable organization unless local conditions may prove them impracticable.

"Initially, the organization should be established by the mayor or, in the case of manager cities, by the city manager. This is in accordance with the recognized principle of the executive budget, as in general the procedure is comparable to that of budget making. In some instances, of course, the compiling agency might be selected by the city commission, as in a straight commission type of city, or by a board of estimate, or other specially created budget authority, such as is found in Minneapolis or Multnomah County (Portland), Oregon.

"Presumably the agency would be an official one, in order to assure the cooperation of the public officials and serious attention to the final report. In the absence of proper initiative by those in public office, however, it is conceivable that a private organization, such as a planning association, chamber of commerce, bureau of research, or citizens' committee, might formulate its ideas of the desirable trend of civic improvements.

"The program, preferably, should be outlined by a representative and responsible group of citizens, rather than by any one person. Owing to the importance of the financial phases of the program, citizens having bank connections should predominate, although it is desirable to have also representatives of the retail and wholesale business, manufactories, and real estate interests. Possibly a group of from five to twelve members is the most practical size for a committee. The members would, of course, serve without stipend, although it may be necessary to employ a salaried secretary.

"As will be indicated later, such committee preferably should be a continuing body, in order that the program may be revised, as conditions are substantially altered."

Scope of the Program

The importance of defining, at the beginning of the committee's work, the scope of the program is emphasized by Mr. Rightor. This will include such questions as: Shall it be limited to the city government? Shall it include quasi-independent boards, such as the publicly owned utilities, parks, forests, etc? Shall it include the board of education and library board, either or both of which may have jurisdiction beyond the city limits? What shall be its relation to the county government?

Several paragraphs are devoted to the importance of determining the classes of improvements to be considered, the possible means of financing them ,and the period to be included in the program.

Official Cooperation Necessary

The author recognize the fact that no long-term program can be successful without the wholehearted cooperation of the public officials concerned. On this subject and on the procedure of formulating the program, he says:

"It is obvious that, in preparing a program having to do with the several administrative departments of the city, the cooperation of the public officials is essential. The departments are ultimately to expend the funds and to assume responsibility for services made possible by the improvements. Each official idealizes the service which his department might render were the facilities to be made available. He should be authorized to state his ideals as a help in formulating the program. The extent to which this cooperation may be assured depends upon the organization of the city government. It is assumed here that the mayor or manager may obtain such departmental estimates merely by a formal request addresed to each department head, and that even such independent agencies as the board of education and other elected officials will voluntarily comply, since the results will benefit all.

"In general, the formulation of a long-term improvement program involves the following procedure:

"1. Enumeration of improvement projects, by departments and projects, and the estimated cost of each
"2 Determination of means for financing each project, and total required revenues from each source
"3. Determination of the legal and practical limitations upon each means of financing, during the period
"4. Correlation of total available revenues from all sources with the estimates of expenditures, in total, and by projects
"5. Recommendation of a definite program of improvements by departments and projects, and means of financing them."

The principles recently suggested for Cinnati's long-term financial program are outlined, and the step-by-step procedure recommended for other cities is discussed in some detail.

Disposition of Program

After submission of the program to the mayor, manager or other official or body which appointed the committee, the importance of due publicity, and of consideration and action by the legislative body of the city, are pointed out. The author questions the advisability of putting the program to a vote of the people. On this subject he says:

"It is doubtful whether such program should be put to a vote of the people, but this is a matter for determination not by the committee but by the executive and the legislative body. It is questionable whether the public at large could get a complete understanding of the program without giving it the same or comparable consideration as the members of the committee have given. The amount involved might appear excessive, unless a carefully pursued educational campaign were to precede the referendum. This is regardless of the proposed means of financing. Several cities have submitted programs to the voters, and the result was not uniformly favorable.

"It may be, however, that a vote of the people upon certain phases of the program would be desirable if local budget, tax or bond limitations might be overcome by popular approval. For example, in Detroit, a charter limit of two per cent upon the annual budget (exclusive of schools and library) includes bonds authorized by the council. When the voters approve a bond issue, the budget does not include the item or purpose of such authorization, whether for operation or an improvement. Thus, popular approval of bond issues releases such additional amounts for the purposes included in the budget. The voters of Detroit, accordingly, have approved during recent years bond issues totaling nearly $100,000,000. It is obvious that, with such a budget limitation, it might be desirable to have popular approval of a bond issue for an extensive public necessity, the cost of which when included in the budget would unduly restrict the funds required for ordinary operating purposes."

Conclusions

In conclusion Mr. Rightor expressed the belief that cities will more and more turn to such long-term finance and planning programs for at least a partial solution of their difficulties He predicts that the average business man serving upon a committee to draft a forward-looking program of improvements for his city will find that the city has many difficult problems, which require careful decision upon the part of the public officials in behalf of the tax payers; and that the continuing cooperation and conclusions of bankers, realtors, lawyers, industrialists, etc., as representative leaders in the community upon these pressing problems, will prove of invaluable assistance to, and will be welcomed by, the governing officials.

Present Status of the Science of Water Softening

By Charles P. Hoover

Water Softening and Purification Works, Columbus, Ohio

DEVELOPMENTS in water softening will be described in the following order: (1) Handling of Chemicals; (2) Mixing Devices; (3) Dorr Clarifiers; (4) Methods for Further Reducing Hardness; (5) Substitution of Zeolite for Soda-Ash to Remove Non-Carbonate Hardness; and (6) Recarbonation.

Unloading and Elevating Chemicals to Storage Bins

Methods for handling, storing and applying large quantities of chemicals were crude in the past. Large quantities of chemicals can now be economically handled by unloading them from the cars by means of power shovels or by means of pneumatic conveying devices, and they are cheaply elevated into bins, from which they are subsequently fed into the water by gravity.

Figure 1 shows a penumatic conveying installation to be installed at the new Marion water-softening plant. It is similar to the one installed at the new Springfield, Ill., water-softening plant. The installation consists principally of: vacuum pump, conveying line with intake nozzle, receiving station, and air filters. The pump produces a vacuum through the filters, receiver and conveying line. The nozzle of the conveying line is inserted into the lime or soda ash to be unloaded and elevated. The high velocity of air carries the material to the receiving station. On entering the receiver the velocity of flow is reduced by the sudden increase in volume in the chamber, and the mate-

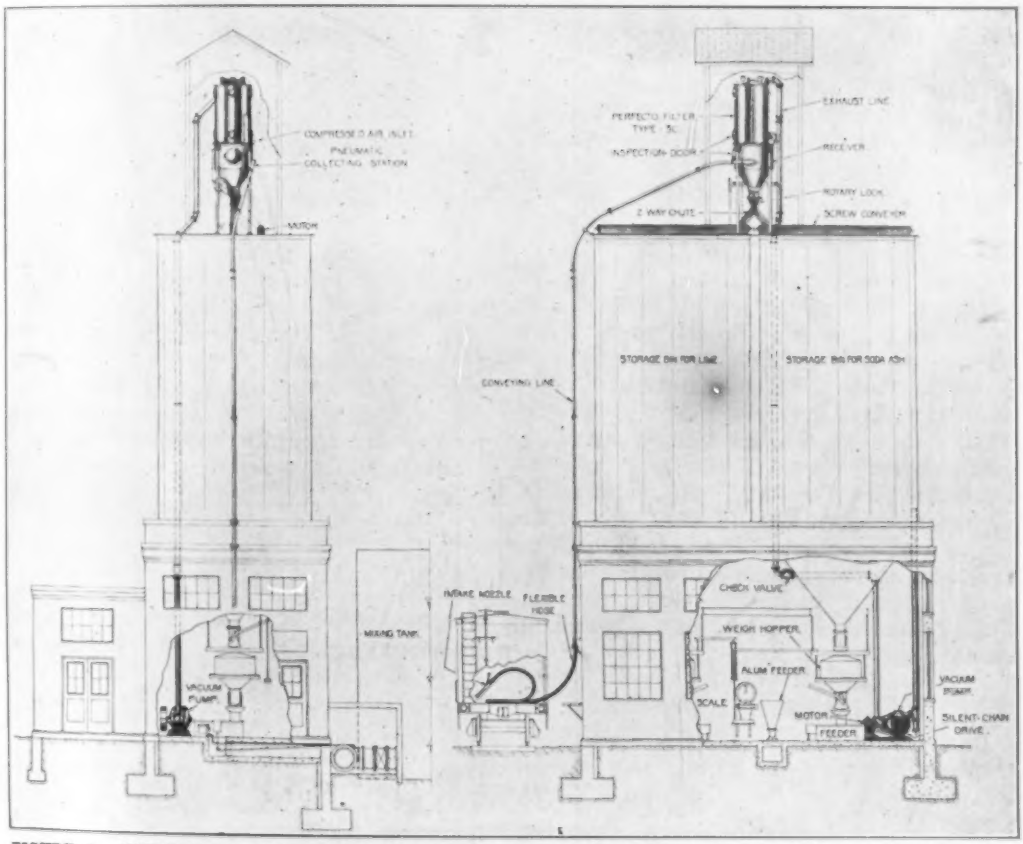


FIGURE 1. PNEUMATIC CONVEYING EQUIPMENT FOR UNLOADING CHEMICALS FROM CARS AND ELEVATING INTO STORAGE BINS

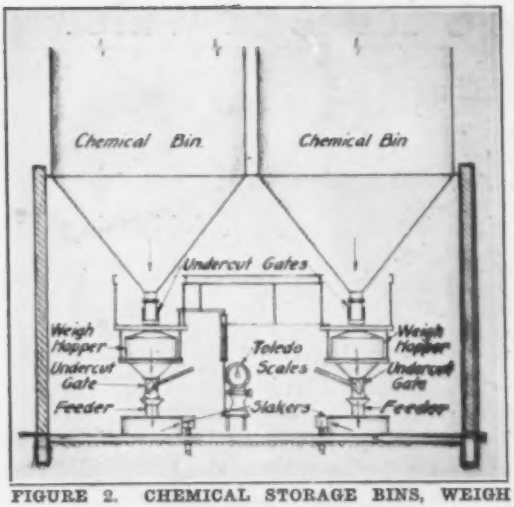


FIGURE 2. CHEMICAL STORAGE BINS, WEIGH HOPPERS AND SLAKER FOR STORING, WEIGHING AND SLAKING LIME AT THE PIQUA WATER-SOFTENING PLANT

rial is dropped to the bottom of the receiver and discharged through a rotary lock into the screw conveyor, which distributes the material across the top of the storage bins. The exhaust air is passed through the filters for the removal of the dust in suspension.

The principal advantages of this system of handling chemicals are: (1) elimination of the most laborious and disagreeable job about a water softening plant; (2) elimination of dust, thereby making it easy to keep the plant clean; (3) saving effected by purchasing material in bulk.

Objection has been raised to this system for unloading lime, on the ground that the lime is brought into contact with a large volume of air and consequently there may be some carbonation. Carbonation of lime does not occur at all in perfectly dry air,* and it is doubtful whether the short exposure the lime has to air, even if a small amount of moisture were present, would result in much, if any, carbonation. Charles Spaulding† Chemist in Charge of the Springfield, Ill., plant, states that he finds no difference in the analysis of the lime at his plant on samples taken before and after unloading from cars by means of the pneumatic conveyor.

Applying Chemicals to Water

In the early days of water softening, the common practice was to add saturated lime solution to the water to be softened. It was thought that because saturated lime water was a true solution, it could be more readily applied in uniform quantities than milk of lime and also the feasibility of thoroughly mixing raw water with milk of lime in large quantities was questioned. It was thought that the raw water and the milk of lime would not be adequately mixed, resulting in a marked loss in softening efficiency, owing to the fact that the suspended particles of lime (calcium oxide) would become coated with precipitated carbonate of calcium and magnesium hydrate, thereby becoming inactive. It was also customary to add lime first and then after a definite period of time to add soda ash. This was done on the theory that the lime would combine with the soda-ash to form sodium hydroxide, which would absorb free and half-bound carbon dioxide, resulting in a wastage of soda-ash for doing work that should be done by lime, a less expensive reagent.

This theory was wrong, because the absorption of carbon dioxide by the sodium hydroxide results in the formation of sodium carbonate, and it therefore apparently makes no difference whether the lime and soda-ash are added separately or together. In many plants using solution feeds, they are mixed together in the same tank and fed out as one solution.

Dry-feed machines for measuring the chemicals and these same machines equipped with continuous lime slakers have been developed, and their introduction permits the elimination of chemical solution tanks with all their attendant difficulties, familiar to all water-works operators.

Figures 2 and 3 show the method used for weighing and slaking lime at the water-softening plant at Piqua, Ohio. The chemicals drop from the bins through under-cut gates to the weigh hopper. From the weigh hopper, the material flows into a Browning feeder. Figure 3 shows the Browning feeder, which consists of a hopper, a cylinder provided with a piston, and means for adjusting the length of

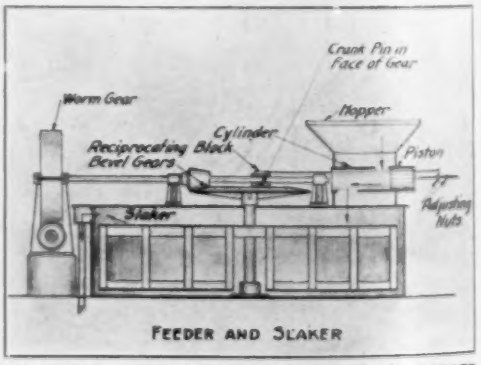


FIGURE 3. THE BROWNING CHEMICAL FEEDER AND SLAKER

*Depreciation of Quick Lime, Copeland & Sperry. *Engineering News Record*, May 13, 1911.
†Private communication.

stroke of the piston. The piston is operated by a crankpin on face of gear driven by the main drive-shaft of the lime slaker. This type of feeder has proved to be very accurate, but with the Piqua chemical feeding equipment it is not necessary to depend entirely on the accuracy of the feeder, because the operator can see at a glance, by looking at the weigh-hopper scale, just how much lime has been fed during any interval of time. For instance at Piqua, approximately 250 pounds of lime are required per hour when softening at the rate of 5 million gallons in 24 hours. The operator reads the lime weigh scale each hour and if the feeder has not fed exactly 250 pounds of lime, it is adjusted. This results in very accurate application of the chemicals to the water, which is one of the most important features of the whole process of water softening.

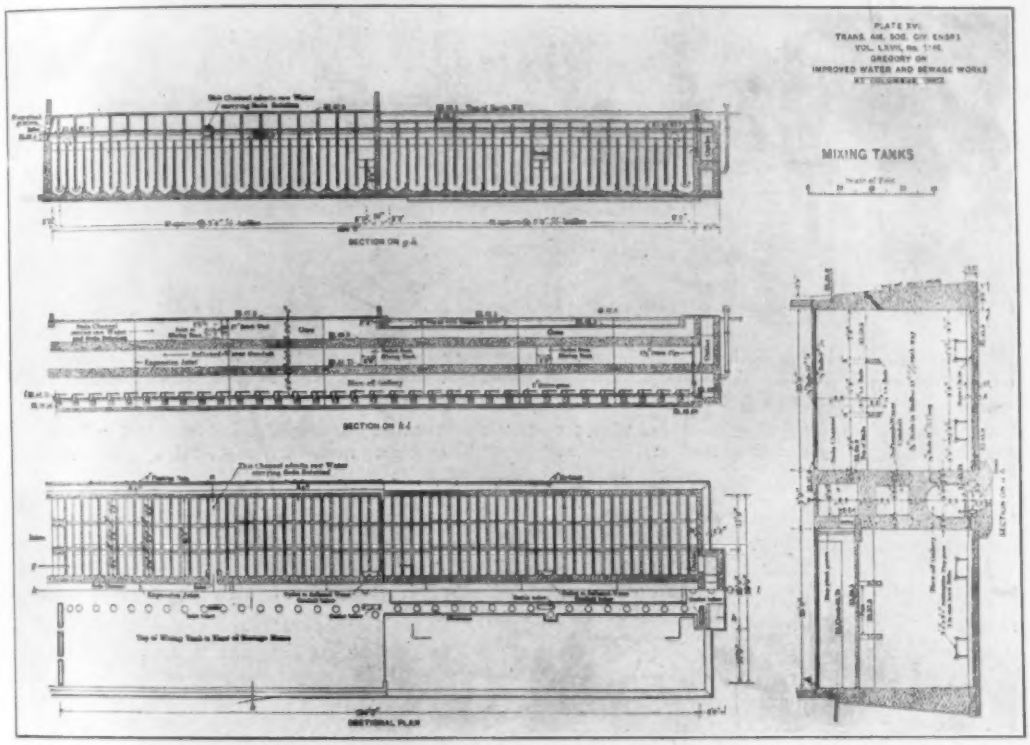


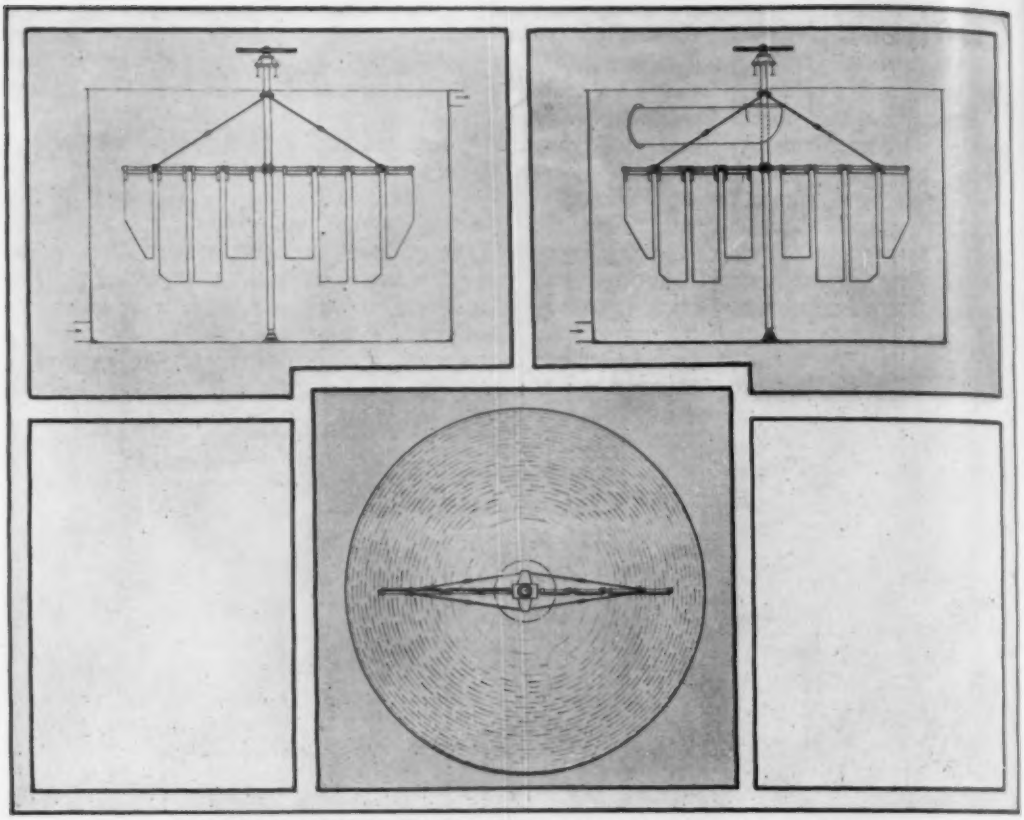
FIGURE 4. BAFFLED MIXING TANK FOR MIXING CHEMICALS WITH THE WATER AT COLUMBUS WATER-SOFTENING PLANT

Mixing Tanks or Agitating Devices

Two types of mixing or agitating devices have been used at water-softening plants: (1) baffled tanks with various combinations; (2) mechanical agitators. The over-and-under type baffled tanks have been successfully used at the Columbus plant for the past twenty years. They are shown in Figure 4. Mechanical agitators are shown in Figures 5 and 6. Figure 5 shows the type of agitating device designed at the Sacramento, Calif., water-filtration plant under the direction of Charles G. Hyde. This type tank has been used at the water-softening plants at South Pittsburgh, Pa.; Miami, Fla.; Springfield, Ill.; Hinsdale, Ill., and Piqua, Ohio.

The paddles are swung from the paddle arms by means of plate clamps, the paddles thus being allowed to assume a more or less horizontal position when the agitating device is started, but the weight of the paddles is such that, when motion in the tanks is obtained, the paddles assume a vertical position. This is to take the load off of the motor in starting up the agitators. The relation of the area of the paddles to the area of the central vertical section of the tank is 25 per cent. Even with this large paddle area, uniform velocities are not maintained.

There seem to be two zones—an inner and an outer one. The inner zone is from the center to about one-third out, and the outer zone from there to the walls of the tank. The velocity is too low in the inner zone, and scarcely any floc can be seen, whereas in the



FIGURES 5, 6 AND 7, SHOWING TYPES OF MECHANICAL AGITATORS

Figure 5, at left, mechanical agitator for mixing chemicals with water, showing inlet at bottom and outlet at top. Figure 6, at right, agitator with inlet at bottom and outlet at center of tank. Figure 7, below, plan of agitator showing uniform velocities

outer zone very satisfactory floc formation is obtained. See Figure 7.

A modification of the type described is shown in Figure 6. Instead of discharging the water from the side of the tank, it is discharged through a take-off pipe from the center. It is believed that by this modification there will be no short-circuiting of the water through the tank and more uniform velocities will be obtained.

The baffled tanks as built at Columbus are satisfactory and none of the mechanical tanks already built give any better results, but mechanical tanks are less expensive to build and they remove the necessity of lifting the water the extra two or three feet necessary to pass it through baffled mixing tanks; and, although agitators require power to keep them running, the cost of operation, if proper drive is provided, should be less than the cost of the additional lift of the water. They also provide greater accessibility and flexibility.

Dorr Clarifiers

The disposal of the large quantities of sludge formed by the softening reactions was a problem in the past, especially when a water-softening plant was built along a small stream.

It was the custom, and still is at a few of the older plants, to allow the sludge to accumulate in the settling-basins and to discharge it from the basins intermittently. At the Columbus plant the sludge is held for a period of thirty days, and one of the disadvantages of doing this is that on each successive day the capacity of the tank decreases. Another disadvantage is that when the sludge is discharged in such large quantities into a stream, especially one as small as the Scioto River, it causes the stream to become very unsightly.

Apparatus has been developed which may be installed in the settling-basins or clarifiers, making it possible to remove the sludge produced from the water-softening reactions continuously. Practically all the municipal water-softening plants built within the last five years have been provided with Dorr clarifiers for removing sludge continuously. Figure 8 shows the square type clarifier, and Figure 9 shows a round clarifier. There is a difference of

opinion as to the relative merits of the round and the square tank, and there is also a great deal of discussion as to the best method of flowing the mixed water from the mixing-tanks into the clarifier.

Methods for Further Reducing Hardness

In the early days of water softening, limited results were obtained in reduction of hardness on account of the formation of soluble complex basic carbonates of magnesium, which may be represented by the following formulae:

$$Mg_4(OH)_2(CO_3)_3$$
$$MgCO_3 \cdot NaHCO_3 \cdot 4H_2O$$
$$MgCO_3 \cdot Na_2CO_3$$

These soluble salts cause the alkalinity of the softened water to be high, especially when soda-ash is used with the lime to reduce non-carbonate hardness, and consequently water that is high in non-carbonate hardness is more difficult to soften than water with an equivalent amount of hardness but low in non-carbonate hardness.

Figure 10 shows, by curves, the change of the alkalinity and non-carbonate hardness of a magnesium water when treated by the lime soda-ash method. The non-carbonate hardness should decrease along the broken diagonal theoretical line; instead, the non-carbonate hardness decreases along the circled line which remains above the broken theoretical line, thus showing that the theoretical calculated amount of non-carbonate hardness is not removed. The alkalinity should remain constant and follow the broken horizontal theoretical line. On the addition of soda-ash, instead, the alkalinity rises along the circled line above the theoretical line. This behavior is characteristic of magnesium waters, regardless of whether the magnesium is in the form of sulfate, chloride or other radical. It is believed that the portion of soda-ash not going to remove the non-carbonate reacts with the magnesium salts in the water, forming complex basic salts.

The limitations in the reduction of hardness have been largely overcome by (1) the hot process, (2) excess lime treatment, (3) split treatment, (4) excess lime followed by carbonation, (5) the use of compounds of alumina, and (6) substitution of zeolite for soda ash to remove non-carbonate hardness. These processes are explained in detail by the author in *Industrial and Engineering Chemistry*, May, 1927, Vol. 19, No. 5, and only the last one will be discussed in this paper.

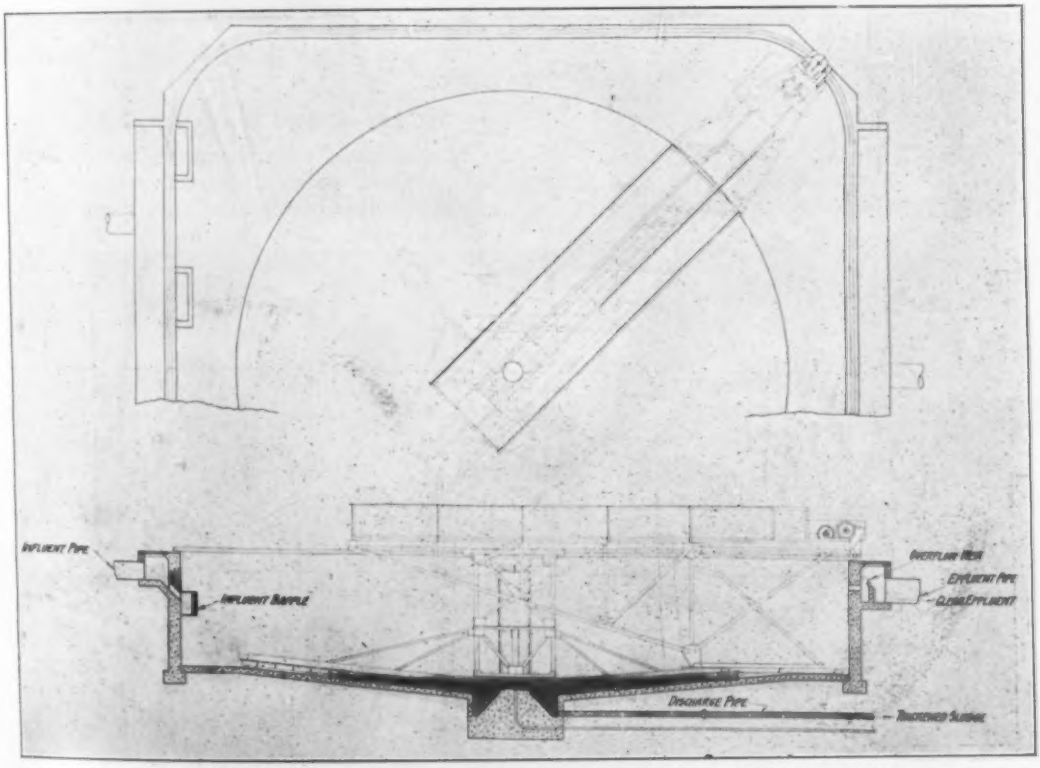


FIGURE 8. SQUARE TYPE DORR CLARIFIER FOR CONTINUOUSLY REMOVING PRECIPITATED SLUDGE FROM SOFTENED WATER

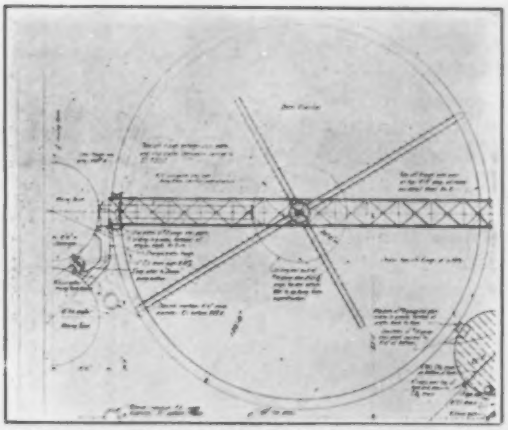


FIGURE 9. ROUND TYPE DORR CLARIFIER FOR REMOVING PRECIPITATED SLUDGE FROM SOFTENED WATER CONTINUOUSLY

Substitution of Zeolite for Soda-Ash to Remove Non-Carbonate Hardness

Where salt may be obtained at a fair cost, it is cheaper to remove non-carbonate hardness by means of zeolite than by means of soda-ash. At Columbus, the discontinuance of the use of soda-ash and the substitution of zeolite equipment is being seriously considered. If it is adopted, the entire supply of water treated will be softened with lime, coagulated with alum, settled, and carbonated; then a sufficient quantity of it will be softened to zero hardness by zeolite, so that by mixing the zero water with the lime-softened water the resultant mixture will have the desired degree of hardness. At the Columbus plant $115,000 is spent annually for soda-ash. It is believed that a plant for zeolite treatment can be built for $150,000. The interest on this investment at 5 per cent would amount to $7,500 the first year, but would be less each succeeding year. Retirement charges for five-year bonds would amount to $30,000 per year, and it is estimated that the operation cost would be $75,000, making a total cost of $112,500 per year. This amounts to less than is now being spent annually for soda-ash, and if the zeolite plant is installed, it should pay for itself in five years. These cost figures are tentative esti-

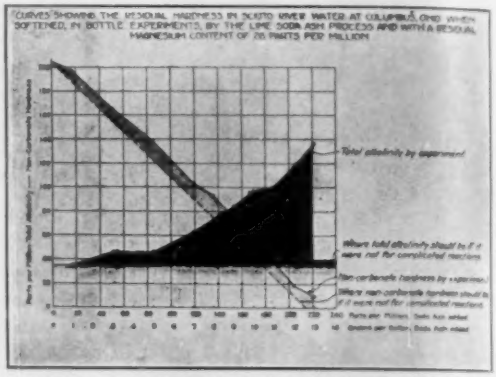
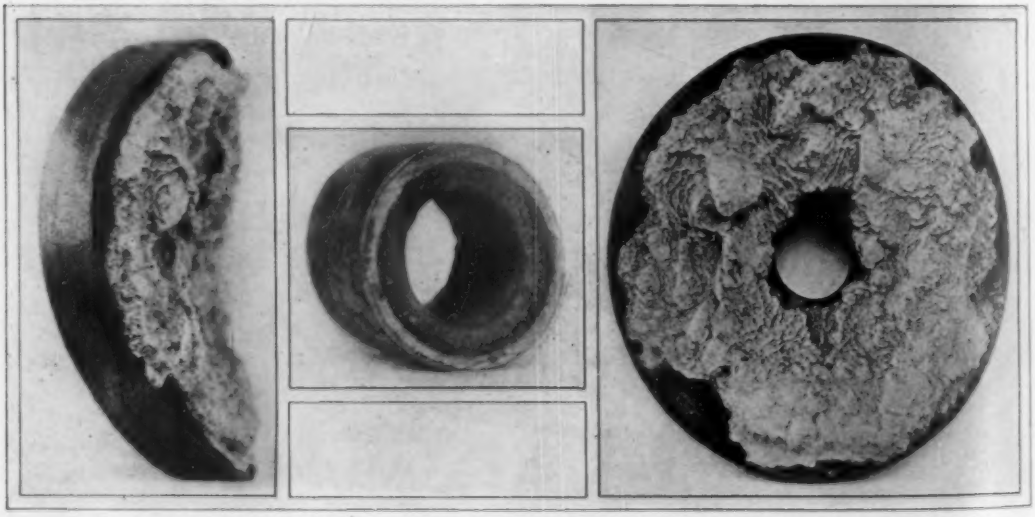


FIGURE 10. CURVES SHOWING THE RESIDUAL HARDNESS IN SCIOTO RIVER WATER AT COLUMBUS, OHIO, WHEN SOFENED IN BOTTLE EXPERIMENTS AS INDICATED

mates and must be carefully checked before a decision to change the method of treatment is made.

Lime-softened Water Not Stable

Lime-softened water is not stable, because it is super-saturated with normal carbonates of calcium and magnesium, and distribution sys-



CALCITE COATINGS DEPOSITED FROM LIME-SOFTENED WATER ON THE INTERIORS OF PIPES
Figure 11, center, deposit in hot-water pipe. Figure 12A, left, deposit in cold-water pipe. Figure 12B, right, side view of same pipe shown in Figure 12A

tems carrying the water become incrusted with deposits of the carbonates. Difficulty with the deposits is also encountered in meters and hot-water pipes in hotels and public buildings, because the water in these buildings is usually heated to a temperature higher than the average (Figure 11, 12 A, and 12 B). The filtration of lime-softened water through sand filters has a very bad effect on them, because the normal carbonates crystallize on the surface of the sand grains, covering them with an adherent coating and causing them to grow in size and finally to lose their effectiveness as a filter medium (Figure 13). The sand grains not only grow in size, but they also cement themselves together, forming hard lumps in the filters, and the water to be filtered will not pass through them. Once or twice a year it is necessary to spade up sand filters, filtering lime-softened water, and, crush all hard lumps, and after seven or eight years of service the filter must be rebuilt (Figure 14). Lime-softened water has the same effect on green sand or zeolites that it does on ordinary filter sand.

FIGURE 13. CALCITE COATING DEPOSITED FROM LIME-SOFTENED WATER ON FILTER SANDS ILLUSTRATING PROGRESSIVE GROWTH OF SAND FROM YEAR TO YEAR

Exhibit furnished by Walter Sperry, Grand Rapids, Mich.

Recarbonation

Lime-softened water is now being cheaply and satisfactorily stabilized by recarbonizing it with carbon dioxide gas at the following Ohio water-softening plants: Columbus, Defiance, Newark, Delaware, Piqua, Greenville, Batavia, and Girard. Hinsdale, Ill., Miami, Fla., and Springfield, Ill., are also recarbonizing. Plans for a plant are being prepared for the city of St. Louis.

Carbon dioxide is produced by burning coke, pulverized coal, oil or gas in a suitable furnace. After scrubbing and drying, the carbon dioxide gas is diffused into the water through small openings in a grid system located ahead of the filters.

Comparison of Fuels for CO_2 Production

A carbon-dioxide plant should deliver as high a percentage of the gas as controllable combustion will permit. The available fuels from which carbon dioxide can be obtained are coke, which yields about 3 pounds of carbon dioxide from 1 pound of fuel; artificial gas, which yields about 82 pounds of carbon dioxide from 1,000 cubic feet burned; natural gas, yielding about 115 pounds per 1,000 cubic feet burned; kerosene or similar oil, which yields about 20 pounds of carbon dioxide per gallon burned; and producer gas made from coke, yielding about 3 pounds of carbon dioxide for each pound of coke gasified.

In a small plant the fuel expense is practically negligible, and natural gas is really the most suitable fuel because the equipment can be almost entirely automatic. The next most convenient fuel is kerosene or similar oils, which when properly burned in a brick-lined furnace give products of combustion that are tasteless and odorless and in every way suitable for recarbonation of water. The products

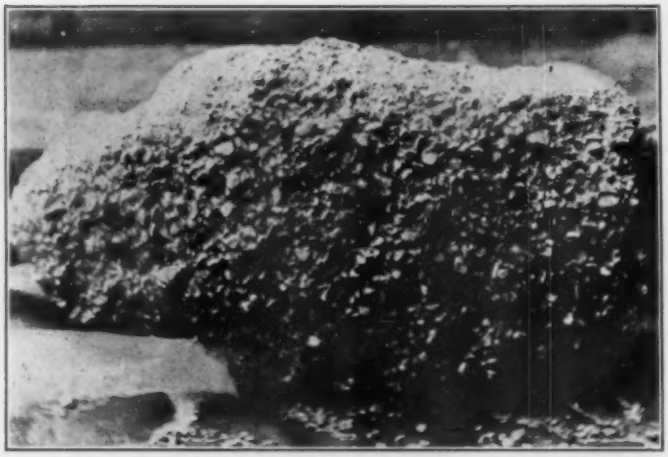


FIGURE 14. CALCITE COATING DEPOSITED FROM LIME-SOFTENED WATER ON FILTER SAND AND GRAVEL
The particles have been cemented together in a hard lump

of combustion from burning these fuels contain about 12 per cent carbon dioxide. The burning of coke in an ordinary furnace or stove produces a gas containing only from 4 to 6 per cent carbon dioxide, therefore a much larger air-compressor must be provided for forcing the gases into the water than where the other named fuels are used.

CO_2 Plant at Columbus

For large installations, producer gas made from coke and then burned to complete combustion under proper conditions is the most economical method for obtaining carbon dioxide. Such a plant has recently been built at the Columbus water-softening and purification works. The gas-making plant consists of six principal parts; a gas producer, a gas burner, a return tubular boiler, a steam-driven air-compressor, a combination scrubber and drier, and a diffuser. In operation, coke is burned in a gas producer, which is a closed furnace with controlled air supply furnished by a blower. The products of combustion pass from the gas producer to a gas burner, where they are mixed with air and burned to complete combustion under a boiler. The steam produced in the boiler is used to drive the air-compressor and blower in order to make a closed cycle for the process, or, as the plant is located in the boiler-room of the pumping-station, the steam produced may be connected with one of the main steam lines. The air-compressor takes its suction from the boiler stack of the producer gas-burning boiler, through a scrubber and drier, and force the washed gases through diffusers into the water to be carbonated. Making producer gas from coke and burning it under a boiler is perhaps the most economical method of producing carbon-dioxide gas, because the steam generated is readily available and it is possible to produce a gas containing as much as 17 per cent carbon dioxide, thus requiring an air-compressor of only one-fourth the capacity necessary if coke were burned in an open furnace. Figure 15 shows an outline sketch of the recarbonation plant plant recently built at Columbus.

Action of Carbon Dioxide on Softened Water

The carbon-dioxide gas converts the normal carbonates, which are only slightly soluble, to bicarbonates, which are highly soluble and will therefore not be easily precipitated from the water

At all the water-softening plants now operating recarbonators, just enough carbon dioxide is added so that the carbonated water shows a slight trace of color when phenolphthalein is added. The carbonated water should have a pH of from 8 to 8.5.

Recarbonation Should Not Increase Corrosive Properties of Water

The advisability of recarbonating a lime-softened water has been questioned on the ground that the release of the carbon dioxide in hot water would result in an increase in corrosiveness. This might well be true if one put in too much CO_2 so as to get aggressive CO_2, but this would be unwise for two reasons: first, it would be wasting CO_2; and, second, it would cause corrosion. It should be understood that the recarbonated water does not contain any dissolved or free carbon dioxide, as only a sufficient amount to chemically combine with the normal carbonate is added.

Carbonation of a softened water makes it resemble natural water. A water-works chemist can very easily identify a sample of lime-softened water because of its difference from natural water. He could not, however, identify a lime-softened water that had been carbonated, because the results of analysis would be similar in all respects to any natural water of similar hardness.

Many cities are adding lime to their water-supplies to prevent corrosion, and when lime has been added to a natural water in sufficient quantity to increase the pH to 8 or 8.5, it will exactly duplicate lime-softened carbonated water of equal alkalinity. Baylis* found that

*Journal A.W.W.A., 10-385.

by adding lime to the Baltimore city water so that the pH was increased to 8.5, corrosion was practically eliminated. Carbonation plants have been in operation now for the past five years and during this time no increase in corrosion has occurred. Objection has also been made to using lime-softened carbonated water in boilers on the assumption that it would be more corrosive than the uncarbonated water. Barr and Savidge† state that by far the greatest number of waters used by the railroads of this country are substantially neutral, having a pH value of 5 to 9 and that their corrosive action is due to dissolved oxygen. It is inferred from this that corrosion is independent of the reaction of the water as long as it is in the neutral zone. This is also borne out by Foulk‡ who says: "Experimental evidence seems to show that from about pH 11 to pH 5, the rate of corrosion is independent of the hydrogen-ion concentration and the only controlling factor in this range is the concentration of oxygen." He also states that from pH 4 and on to greater acidities, the rate of corrosion is proportional to the hydrogen-ion concentration.

Koyl,** Engineer of Water Service, Chicago, Milwaukee & St. Paul Railway, says that carbonic acid never does any damage to the water-covered parts of a boiler unless there is a large amount of oxygen also present.

If, as has been stated, the hydrogen-ion concentration is not a factor in the rate of corrosion between pH 11 to pH 5, then the lowering of the pH of a lime-softened water by carbonation to 8 or 8.5 would most certainly not increase its corrodibility.

Addition of Aluminum Salts to Lime-softened Water Not a Substitute for Recarbonation

It has been claimed, by those interested in the promotion of the sale of sodium aluminate, that if sodium aluminate is used, incrustation of sand grains through which the water is filtered will not take place and also there will be no trouble from deposits in the distribution system. Aluminum sulfate has been added to the Columbus water for the past twenty years, and as a result of this, deposits on the sand grains and the distribution system have been kept at a minimum, but we do not believe that it would be possible by the introduction of an economical amount of aluminum sulfate or sodium aluminate for a municipality to produce an entirely stable water.

Baylis‡‡ has shown that a low-alkalinity water, such as that produced at a municipal softening plant, will deposit calcite coatings, when the pH value is 8.5 or more and lime-softened sodium aluminate treated waters have a pH exceeding 10.

Municipal water-softening plants usually soften to from 70 to 100 parts per million. Such a water will be saturated with calcium mono-carbonates and be inferentially but certainly unstable. It may be, however, that water softened to 25 to 30 parts per million by excess treatment and treated with aluminum sulfate or sodium aluminate will be stable because the mono-carbonate concentration is below the saturation point.

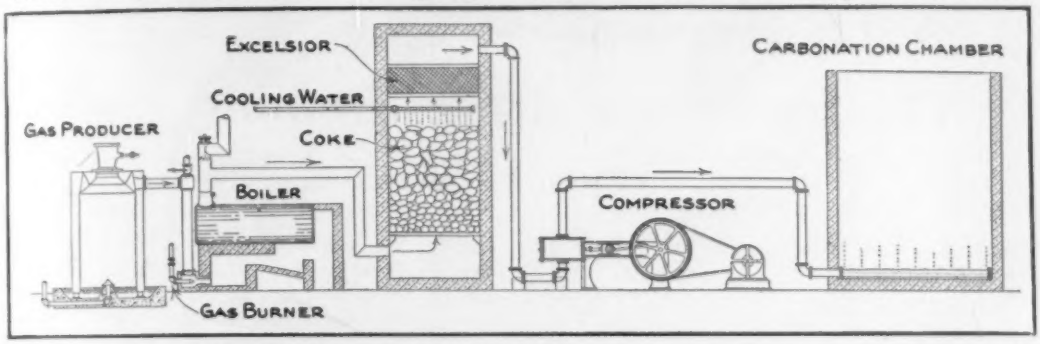


FIGURE 15. CARBONATION PLANT RECENTLY BUILT AT THE WATER-SOFTENING AND PURIFICATION WORKS AT COLUMBUS, OHIO

†Transactions, American Institute of Chemical Engineers, Vol. 18, page 69.
‡Industrial Water Supplies, Geological Survey of Ohio, Bulletin 29, page 99.
**Private communication.

‡‡Paper read before the April meeting of the American Chemical Society.

ACKNOWLEDGMENT.—From a paper presented before the American Water Works Association, at Chicago.

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BATHING BEAUTIES OF YESTERYEAR

The Evolution of a Swimming Pool

By C. E. Miles

IN December, 1904, a company was incorporated to build a new amusement park in Columbus, Ohio. During the months of January, February and March, ideas were developed and plans drawn for the installing of many features, but the real "hobby" was the building of a concrete swimming pool, there being no available place in or near the Capital City where this pastime might be enjoyed.

The original plans for the pool called for a length of 100 feet and a width of 50 feet, but as the work progressed the promoters became so enthusiastic that the size was increased from day to day until upon completion it measured 238 feet in length and 140 feet in width, being 2 feet 6 inches deep at the shallow end and 9 feet 6 inches deep at the deeper end, with a concrete floor of gradual slope from end to end, having no breaks or steps of any kind. The walls of the pool were built with a batter, being 4 feet on top and furnishing a fine place for sun-basking and resting. The water-supply was furnished by eight 8-inch wells and pumped by an air-compressor furnished by the Ingersoll-Rand Co.

Bribing the Women to Swim

The building of the pool was an innovation in this community, for nothing of the kind had ever been attempted before. After the pool had been filled with clear, sparkling water and the tempting chutes installed at the edges, however, the real difficulty came—that of persuading the people, especially the women, to "go swimming," for at the time of installation there were not more than a dozen women who could swim, living in Columbus. Finally, we gave the women two dollars apiece to go into the pool and stay twenty minutes. These women wore bathing-suits with skirts to the ankles, stockings, shoes, corsets and double caps with frills around the edge. We also provided a canopy extending from the bathhouse into the pool so that the women would be in water waist-deep before they became visible to the onlookers. This condition had continued for a little over a season when a storm destroyed the canopy. It was never replaced, and we found the timidity of the women decreasing and before long the skirts of the bathing-suits came only to the knees, and the stockings were removed after the water had been reached. With the aid of expert instructors from New York and Atlantic City, it was not long until we had more women patrons than men. A very few more seasons and we found it needless to purchase any stockings or shoes for the bathhouse and only one-piece bathing-suits for the women.

This pool has been operated every season since 1905. During some of our very long, cold winters it was frozen over and skating was the program day and night. In the spring of 1926 it was decided to modernize the pool and keep abreast with the times, and what we think is the best filtering equipment and sterilizing apparatus obtainable was installed. At this time we found the old walls and bottom were in almost perfect condition and the new wall which was installed to carry the scum gutter was bound to the old wall.

Sanitation of the Modernized Pool

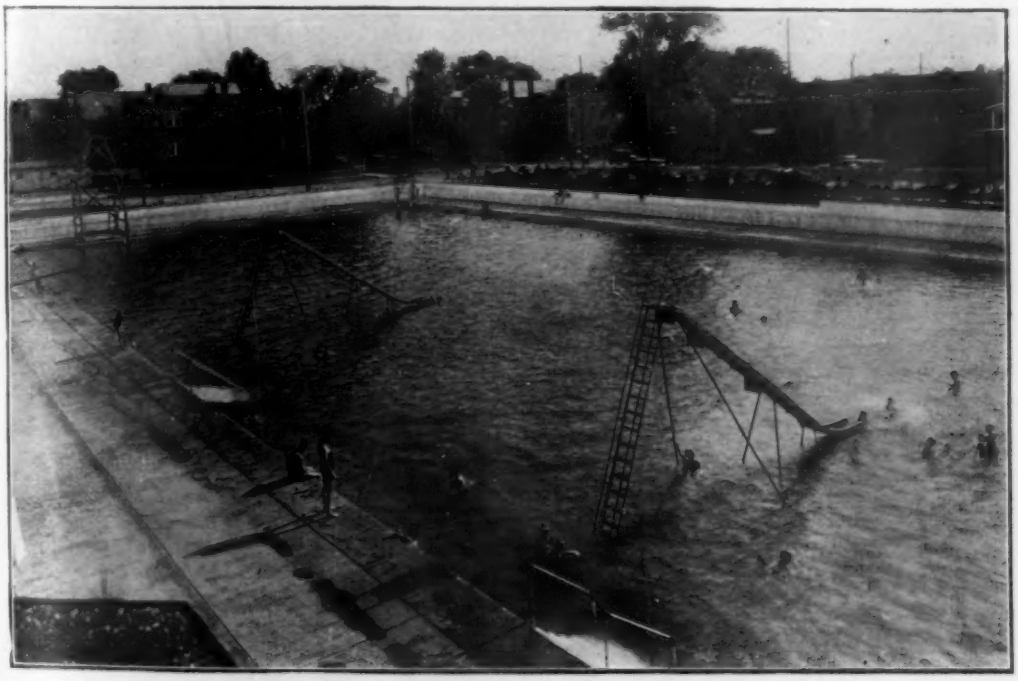
Today this pool with its filters and sterilizing equipment, scum gutter and drains, is one of the best and largest concrete swimming pools in the country and is modern in every respect. During the season of 1926 the water in the pool was constantly circulated through the filters at the rate of 42,000 gallons an hour. A vacuum cleaner is in the new equipment and with it the bottom and walls of the pool are kept clean and absolutely free from any growth of algae or any deposit or sediment of any sort.

It was found that 100 pounds of copper sulphate put in the pool at the beginning of the season was sufficient to prevent the formation of algae, and the addition of 10 to 15 pounds a week was sufficient to keep the proper proportion of copper in the water. The reason this weekly addition has to be made is that the filters are backwashed each morning by reversing the circular pump and using the water from the pool; also, the loss of water over the scum gutter helps to lower the level of the pool and fresh water must be added from the wells or the city line, and this weekly addition of copper sulphate must be made in order to keep the percentage at the standard.

Chlorine gas is used to sterilize the water and is applied to the water through a Wallace & Tiernan MSVM chlorinator at 10 pounds per million gallons of water. The

THE NEW FILTRATION EQUIPMENT

filters are of the vertical type, and three are used, each having a capacity of 14,000 gallons per hour. As the filter house and equipment are all above the water-level in the pool, a foot-valve was installed on the suction line under the water and in this way the pump suction is not broken when the plant is shut down. A double suction American-Marsh centrifugal pump with a 15-hp. General Electric motor circulates the water through the filters and also furnishes the backwash water. The entire equipment was sold by the Graver Corporation, East Chicago, Ind., through their Ohio office, and was installed under their direction.



GENERAL VIEW OF THE MODERNIZED POOL

The three Graver filters are each 9 feet in diameter. Water is taken from the deep end of the pool by the pump and pumped through the filters and on to the shallow end of the pool, where four 4-inch inlets spaced 20 feet apart and 12 inches above the water-level empty the water into the pool, each inlet forming a cascade, which is very popular with the youngsters. The main piping around the pool is 8-inch galvanized steel. The filters are operated 24 hours a day all through the season and require attention only in the mornings when they are backwashed. The night watchman is near all the time. Only once since installation have the filters stopped, during a swimming season, and that time the city current was off during a storm. No soda ash has been used at any time.

This pool has gained in popularity from year to year and thousands and thousands have learned to swim here, both men and women. The attendance varies from 200 to 4,000 a day, according to the weather, and where it was novelty or "hobby," in the beginning, it is now a staple business with a consistent clientele.

Playgrounds Without Children and Children Without Playgrounds

By W. S. Deffenbaugh

Chief of City Schools Division, United States Bureau of Education

"PLAYGROUNDS without children" and "children without playgrounds" well expresses a municipal playground at a school recess period, and a school playground at the same period with hundreds of children attempting to play within its congested space. Such conditions exist in almost any city that maintains municipal playgrounds. In many instances these grounds, being remote from the school buildings, are used by the children only after school hours, or on Saturday and during the summer vacation. On the other hand, it is not unusual to find the school grounds closed at these times.

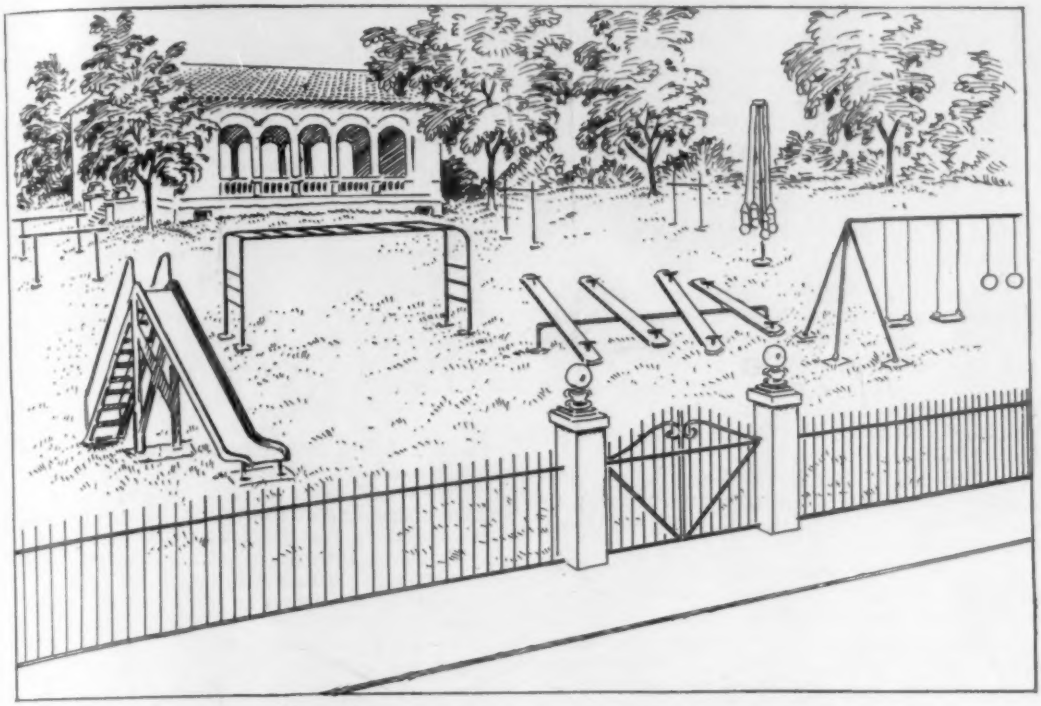
Where such conditions exist, it is evident that better cooperation is needed between the board of education and the commission or person having charge of the municipal playgrounds. How to bring about better cooperation is a problem. Possibly the school board and the city department having charge of playgrounds could employ the same person to have supervision of all playground work in the city. Whenever possible, and especially if the school grounds are small, the municipal playgrounds should be adjacent to or near the school buildings. If the school grounds are large enough for playgrounds, they should be open after school, and on Saturday and during the summer months. It is a rare thing for a city to provide enough playground space for its children, but if school playgrounds in some cities were open all the time, there might not be such a lack of play space. Boards of education should see that the school grounds are used all the time either by maintaining playgrounds themselves or turning the school grounds over to the city when school is not in session.

Planning the Daily Program for Maximum Use of Playgrounds

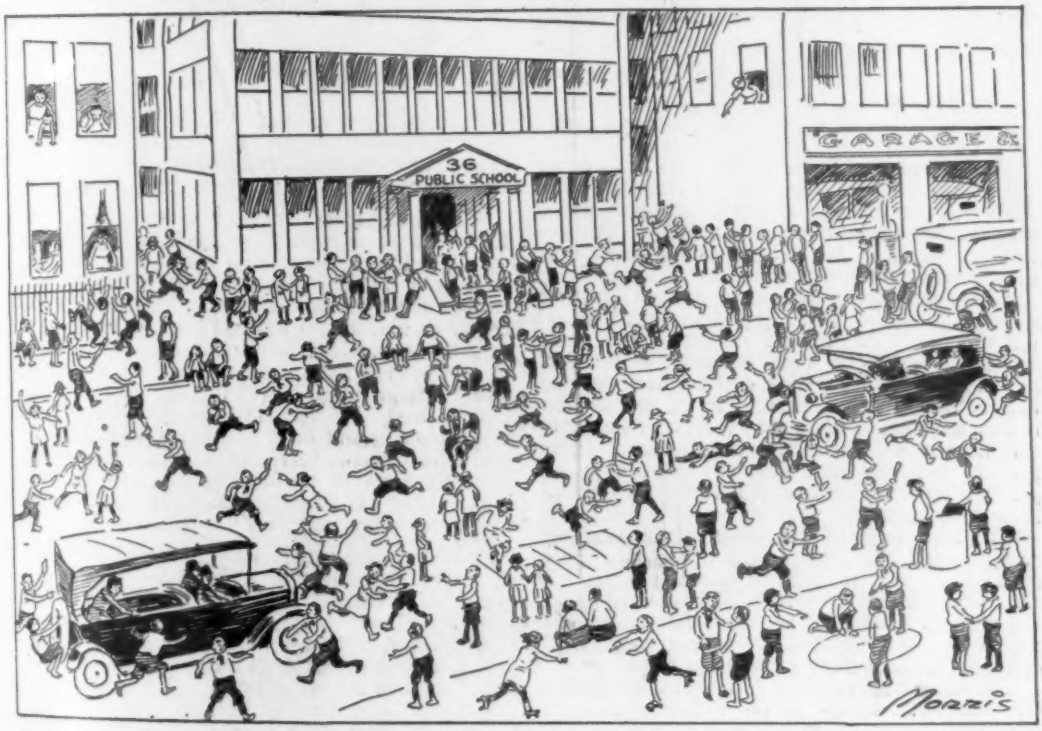
In many cities better use could be made of the school grounds while school is in session. If the playgrounds are small, it is evident that when 500 children are turned loose at the recess periods the grounds will be so crowded that no one can play. It would be much better if the daily program were planned so that there would be children on the school grounds at practically every period of the day. If there are ten 30-minute periods and 500 children in the school, 50 children on an average could be on the playgrounds at each period. This would give each child 30 minutes of play during the school day and would be better than the plan of having two 15-minute recess periods with the entire school of 500 pupils attempting to play at once.

In brief, every city should plan to make as constant use as possible of both its municipal and school playgrounds. Any city that does not is depriving the children of the opportunity to play. The problem of the efficient use of school and municipal playgrounds is one that needs to be studied in many a city.

PLAYGROUNDS WITHOUT CHILDREN—



AND CHILDREN WITHOUT PLAYGROUNDS



Drawn for THE AMERICAN CITY *by Morris to illustrate the accompanying plea by W. S. Deffenbaugh for more effective coordination of municipal and public school recreation systems.*

Chicago Councilmen Report Against Indeterminate Franchises

IN a recent report of findings and progress, signed by Aldermen McKinlay, Mills, Frankhauser, and Smith, the following conclusions were submitted to the Chicago City Council by a subcommittee of the Local Transportation Committee, appointed to investigate the subject of indeterminate franchises or terminable permits in relation to the use of public streets and highways by public utility companies:

1. On the whole, municipalities are very much dissatisfied at their loss of control over local public utilities and are demanding a return of home rule in respect to such utilities.

2. Public utility companies favor regulation by state utilities commissions and the use of indeterminate franchises or permits granted directly by the state.

3. The alleged benefits from the use of indeterminate franchises or permits inure directly to the advantage of the public utility companies and only indirectly, if at all, to the public.

4. In the states visited, improvements in equipment and methods of operation adequately explain improved conditions of service.

5. Increased cost of labor, supplies and operation in general make it impossible to ascertain the actual effect of such permits on rates of fare or other charges for public utility service.

6. Rate making and the valuation of public utility properties by state commissions, subject to review by state and Federal courts, is so technical and expensive that small municipalities are entirely dependent upon the commissions and the utility companies.

7. Federal court injunctions prevent the enforcement of state commission orders so frequently and for such long periods that court regulation is substituted for commission regulation, and commission orders made at very great expense become useless on account of changed conditions.

8. The right of municipalities to terminate such indeterminate permits by municipal purchase contained in the laws providing for such permits, is without meaning unless the municipalities possess sufficient bonding or other financial power to make such right effective.

9. The effect of such permits granted by the state and under state commission control is to relieve the utility companies of any responsibility to local authorities and tend in many cases to make them more independent of the state commissions themselves.

10. Granted by municipal authorities and under municipal control, such permits might tend to better service and lower fares by making it easier for the companies to finance their business, but until municipalities are given home rule over local utilities, an indeterminate permit law will only perpetuate and increase our present troubles.

11. Cities and villages in Illinois should vigorously oppose passage of any indeterminate franchise or terminable permit law in this state, unless such law shall provide for home rule of local utilities and the granting of such permits by the municipalities upon such conditions and limitations as the municipalities may deem it proper to impose.

EDITORIAL NOTE.—For an authoritative discussion of "Franchise Contract vs. the Police Power as a Mode of Utility Regulation," by Delos F. Wilcox, Ph.D., see THE MUNICIPAL INDEX for 1927, pages 108-111.

The Use of Tear Gas by Police Departments

AT the convention of the International Association of Chiefs of Police, held at Windsor, Ont., in June, a paper by John W. Young, of Federal Laboratories, Inc., Pittsburgh, Pa., dealt with the advantages of tear gas as a police weapon, and cited the experiences of various police departments. Mr. Young compared the use of gas with the use of firearms:

"If we were to be ushered in upon our present standard of police work, having presented to us, for the first time, firearms and tear gas, both equally perfected, we would not hesitate in using gas as the every-day weapon and in classifying the firearm as special equipment, for the reason that bullets are deadly, while gas, though effective, is only temporary. But after two centuries of using firearms and little more than two years of using gas, we are still prone to follow in the groove made by long habit. . . .

"Proper training of policemen in the handling of gas would eliminate the use of machine guns upon private citizens, such as occurred in one of our southern cities, when three citizens were killed and nineteen wounded. Such experiences as this can be greatly reduced, if not entirely eliminated, by the proper understanding and use of gas.

"Policemen must be armed, yet we tell them they dare not shoot except in self-defense, which is frequently too late. This ruling is necessitated because a bullet may prove fatal either to the suspect or some innocent bystander. . . .

"The smaller towns are not so fortunate as to have riot squads which they can call upon. It is even more essential, therefore, that they be equipped to handle any situation immediately."

Mr. Young gave a number of examples of effective use of tear gas by police, including the dispersal, before a threatening mob-spirit took control, of a crowd of several thousand Klan supporters and opponents in Detroit; the driving of a crowd back from a spectacular fire, when the fire department was hindered in its work; the clearing of a way for witnesses to enter a court-house where a large crowd barred the way during a sensational trial. He also cited instances where lives of policemen could have been saved by the use of gas, as in subduing barricaded criminals and insane persons. Some of the mistakes of early practice in the use of gas were mentioned, and the ways by which they were remedied.

Another recent advocacy of the use of tear gas, of incidental interest to cities, was that of Dr. Harry N. Holmes, Professor of Chemistry at Oberlin College, in speaking before the Institute of Chemistry of the American Chemical Society on July 6, at Pennsylvania State College. Dr. Holmes was discussing the use of tear gas in warfare, and emphasized its relatively humane character. In his opinion, the public bases its opposition to the use of tear gas upon prejudice and unreasoning fears.

The Health Officer, His Duties and Salary

By Carl E. McCombs M. D.

National Institute of Public Administration and New York Bureau of Municipal Research

WHETHER or not there is a board of health at the head of the health service, the success of sickness prevention work will depend upon its direction by an executive officer who is thoroughly qualified as an expert in sanitary science and public health practice. The application of modern standards of disease prevention requires that the health officer shall be fully qualified by education, experience and personal aptitude for this very important work. The health officer's position is no longer regarded as a political job to be performed satisfactorily by the average local physician as a "side line" of his private practice, or by any well-intentioned but untrained layman. Today, training for public health management is recognized as a special course leading to the degree of Doctor of Public Health in many of the larger universities and, in the best of these schools, the prospective health officer must have had previous professional training either in medicine or in sanitary science. The demand for health officers so trained is growing rapidly, and the evidence of it is to be found in the enactment of state laws and municipal charters and ordinances which specify that the health officer shall be a doctor of public health or shall have qualifications of experience and training which may be accepted as the equivalent of such degree. There are, of course, many excellent health officers now in active service who have gained skill only in the school of practical experience; and there will be many in the future who are not doctors of public health. It seems certain, however, that in the near future professionally trained persons only will be chosen as city health officers.

In a few cities sanitary engineers have been appointed as health officers and some of them have made creditable records. In the majority of cities, however, physicians are chosen as health officers for obvious reasons. The health officer must depend in large measure for the success of his work upon the cooperation of the physicians of the community. The latter are much more likely to support the health officer if he is a physician, and the public is more likely to respect his opinions on health matters if it knows that he understands, as a physician, the nature of disease and its causes. Not all doctors are good health teachers, it is true, but the physician who has been well trained should be better fitted to teach health than one trained in any other profession; and teaching health is a most important part of the health officer's work.

City Health Administration

is the title of an important new book by Dr. McCombs, of which the accompanying article comprises Chapter V. For permission to reprint this copyrighted material The American City is indebted to the author and to the publishers, The Macmillan Co., of New York.

In the chapter here published the author offers many practical suggestions looking towards a higher degree of efficiency in public health administration, and gives excellent reasons for the payment of adequate compensation to men of education and ability.

Although whole-time health officer service is the ideal, there are many small communities, chiefly those under 10,000 population, where the health officer is unnecessary or inadvisable. In such communities, it is the practice to employ a local physician as a part-time health officer. But part-time health officers are still to be found in many cities ranging from 10,000 to as high as 250,000 population, although in the majority of these communities whole-time health officers are needed. In a recent survey of 86 cities in the 40,000 to 70,000 population group, it was found that 41 of the 86 health officers were part-time officials. In another survey of 83 cities of 100,000 population and over, it was found that 30 health officers were giving part time only to their official duties.

Objections to the Part-Time Health Officer Plan

The chief difficulty with the part-time health officer plan is that such person is in most cases a local physician, and this compels a mingling of incompatible elements, the result of which is quite likely to be inefficient health management. The private practitioner who also acts as health officer is many times called upon to take official action which is likely to be injurious to his private professional interests. He must, if he is an efficient health officer, enforce health laws and regulations which may result in the

loss of his private patients. Furthermore, he is likely to find that if he gives the attention to public service which is needed, he is compelled to neglect his private practice, and on the completion of his public career he is in the position of having to build up his private practice anew. The net result is that it is extremely difficult to induce the most competent physicians of the community to accept appointments as health officers, and such appointments not infrequently go to physicians who aspire to political influence or who "need the job" because they are not successful in private practice. It would be unfair to many part-time physician health officers to say that they are either incompetent practitioners or inefficient health officers. It is certainly true, however, that standards of health work and the individual efficiency of health officers are generally much higher where complete separation of public health management and the private practice of medicine is insisted upon. It is certain also that in most cities of 25,000 population, or more, the demands of modern health administration are such as to require the health officer to devote his entire time to his official duties.

In order to meet the need of many small communities where it would be impracticable to provide a whole-time health officer the consolidation of several such communities in a single health district under a whole-time health officer has been found practicable in a number of states. The county seems the most satisfactory unit for health administration of small local units and in certain states, notably North Carolina, South Carolina, New Mexico, Alabama, Ohio, and Georgia, part-time physician health management of local services has been largely replaced by county health organizations, with full-time health officers in charge. There can be no doubt that the elimination thereby of part-time physician health officers has been productive of much higher standards of work in rural and semi-rural places.

The Nature of the Health Officer's Duties

The duties of the health officer will vary somewhat, depending upon the organization of health work and its relation to other services of government. We may, however, define his duties, generally, as of two chief types: (1) the direction of those overhead activities which are common to all branches of public service, as personnel management, purchasing, budget preparation, accounting, record keeping, reporting, etc., and (2) the direction of those special technical activities which are peculiar to health service, as vital statistics registration and research, prevention of communicable disease, child hygiene, food inspection, sanitary inspection, and health education.

If the health officer is merely an executive officer of a board, his responsibilities with respect to these two types of duty may be, and probably will be, limited to the extent that the board takes upon itself managerial duties, as it often does. On the other hand, if the health officer is the sole head of a department of health and has no board intervening between himself and the head of the city government, he will have to be directly responsible for all of these varied duties, under such limitations as may be of general application to all departments of government. His duties with respect to personnel management may, for example, be determined somewhat by civil service regulations, if there is civil service. If there is centralized purchasing for the city, his duties as a purchasing agent will be subject to the general purchasing plan. If there is a properly organized central accounting system for the city government, accounting procedure within his department will likely be governed by the general plan of accounting control.

Overhead Activities

Under the plan previously discussed for consolidating all health and welfare services in a single department of welfare, the duties of the health officer would be limited mainly, perhaps wholly, to the actual direction of technical activities of sickness prevention. That is to say, the health officer as head of a bureau of health of a department of public welfare, would not be responsible generally for the overhead activities above mentioned. The head of the department of public welfare might consolidate these overhead activities for all units of the department under his own direction, or he might choose to delegate certain of them to his bureau or division chiefs. All purchasing, if departmental purchasing is the practice, would probably be done by the head of the department of welfare or by a special staff officer under his personal direction. The selection, dicipline and training of health personnel might also be under the immediate direction of the head of such department unless the authority of the department head in this respect were limited by civil service or other comparable agency. The head of the department would probably prepare and present the consolidated budget for the entire department including the health unit or units and he would be likely to take over under his personal supervision such other overhead duties as might be maintained in common for all units.

Saving the Health Officer's Time Through Good Organization

The latter plan of organization has much to commend it, since it permits the health officer to devote his effort to those activities which have a direct bearing on community health betterment. The health officer who is obliged to spend a large share of his time in dealing with matters of accounting and finance, purchasing, record keeping, etc., is not being used to best advantage. Under such circumstances the community does not get all that it ought from its health officer. If through better organization of city government generally, and the health and welfare activities of government particularly, the health officer can be relieved of responsibilities for these purely routine matters for which he is not ordinarily qualified by training, experience or inclination, it will be possible for him to devote his time in a really productive way, to law enforcement, scientific research, public education and community leadership for health.

On this point it may be well to elaborate somewhat. In the greater number of cities where health work is represented by an independent department, one finds much of the time of the health officer and his assistants devoted to the maintenance of accounting procedure and records. Now, if the general accounting system of the city government is properly organized, the accounting work necessary in the health department or bureau can be reduced to the minimum. All that the health executive needs to know is how much money he has to spend for his various activities and what his expenditures have been for any given period. If the general accounting department of the city government is functioning as it ought, it should be able to furnish him at any time a complete statement of the budget balance available for health purposes, together with the details of expenditure to date classified in any way that he may desire. He may need to keep for his own information special records of unit cost, such as cost per inspection, cost per mile for auto service, cost per patient-day in the isolation hospital, etc., but given a properly detailed statement of expenditures from the city comptroller's office, these cost figures are readily derived provided the health officer keeps proper record of work done. We shall consider this subject in greater detail later.

When the health officer is required to do the purchasing for his department or bureau, it will be necessary for him to follow the procedure of purchasing agents generally. In such case the health officer should prepare specifications for the articles to be purchased; keep an index of prices current for the various articles, and an index also of responsible dealers; prepare forms of contract for goods to be so purchased; call for bids from responsible dealers and authorize the contracts. On the delivery of goods purchased, their inspection should be provided by the health officer to see that they conform to specifications. Even though he may delegate responsibility to a subordinate he cannot well avoid devoting considerable time to the supervision of the work. If, on the other hand, the purchasing function is performed for his department or bureau by a purchasing agent representing the city government as a whole or a group of related agencies, the health officer's duty will be limited to the issuance of requisitions, and the approval of supplies purchased and delivered to him in return. This latter procedure would mean for many health officers a considerable saving of time and energy which could be devoted to more productive work.

In a few cities it has been found of advantage in economizing the time of the health executive to centralize the reception and preliminary review of citizen complaints in one general department or bureau of government. Complaints which are found by such central office to come properly within the field of public health are referred to the health executive for action. The reason for the adoption of this complaint procedure is that the health office is otherwise called upon to receive and review complaints of all sorts, many of which have not the remotest bearing upon community health and in consequence have to be redirected to other departments. The health officer has from time immemorial been regarded by citizens as a person whose chief business it is to correct nuisances and annoyances of all kinds —and unless it is made possible for him to direct his attention only to those which are of health significance much of his energy is likely to be wasted.

We have already suggested in a previous chapter that the health authority should not ordinarily be charged with the direction of services for the care of the sick, except possibly the hospital for the isolation of patients with communicable diseases. If he is charged with such duty, he should not be required to give his personal attention to their technical management. It is not uncommon, where the health officer is personally held responsible for the management of hospitals and other institutions for the sick, that in order to give them the supervision they need, he is compelled to neglect many other activities of greater importance in the prevention of sickness which is his chief

obligation. So the health officer should not be called upon to act as a hospital superintendent or as a hospital attending physician. He should have for such service the necessary superintendents or resident medical officers to whom he may delegate the duties of management. Hospital management is a special field requiring a different type of experience and training than the health officer commonly has and requiring also more personal attention than the health officer alone can properly give to it.

The health officer in the large city must depend mainly upon his subordinates in their special fields to furnish him with facts regarding the conditions requiring the exercise of his special authority. If his various activities are properly organized, his subordinates thoroughly trained and instructed, and their procedure well ordered, the information needed by him on conditions in the field can be made available to him daily as a matter of routine. He will then be able to devote himself more profitably to the development of community cooperation and support for his program. If, on the contrary, he must waste his time and energy doing things which under better organization could and should be done by subordinates, he is either a poor manager or his budget represents a faulty appreciation of values on the part of the community. The health officer must have time to think, to look ahead and plan, to teach health, and to develop in his community the support which he needs. He must be prepared to demonstrate his capacity for health leadership in the community. If he is tied to the routine of an office desk, or required to give his time to activities which are unproductive in sickness prevention, either because his funds are not sufficient to permit him to employ competent aids, or because he is not using himself and his staff to best advantage, he will have little opportunity to develop community interest in health and community support for his work.

The Health Officer and Law Enforcement

The health officer has quite broad discretion in the enforcement of health laws, rules and regulations. The courts are inclined to uphold a health officer in the exercise of his discretionary powers, even though he may in emergency go somewhat beyond the precise limits of the law, provided he is able to demonstrate that he has acted in good faith and in the interest of the public health. If he does go beyond the legal limit of his powers, he is, however, liable as an individual and the injured person or corporation may resort to civil action against him. So the health officer, in the enforcement of law, or his interpretation of it, must be careful to always lay a proper basis for his action. He must not neglect to secure all the facts as far as they are essential in determining the legality of the act.

Although the health officer is in duty bound to enforce public health law, mere law enforcement cannot be relied upon for community health protection. The health laws must of necessity be general in their application, and there will be occasions when strict enforcement of the law is impractical if not impossible. To enforce all public health laws and regulations to the letter might require in many cities an expenditure of time and money for inspectors and other agents which would not produce an equivalent return in health protection. Many health laws and regulations are still found in effect which are inconsistent with present knowledge of sanitary science. Many others, though of clearly proven necessity, can only be enforced adequately by the development of a spirit of obedience to health laws on the part of citizens. The sanitary policemen is a necessary agent for health protection, but the wise health officer usually relies less upon the exercise of his mandatory police powers than upon health education and health persuasion. However, when he must resort to strict law enforcement there should be no hesitation or delay, for the effectiveness of his action will depend largely upon the promptness with which it is taken.

A good illustration of the situation confronting the health officer in law enforcement is found in the control of communicable diseases. The public health laws invariably require that physicians and others having knowledge of the existence of such diseases shall report the facts to the health authority within a stated time, usually twenty-four to forty-eight hours after observation. Now this is a necessary law because otherwise such diseases might spread rapidly even to epidemic proportions. It is essential that the health officer enforce this law, but it must be done with discretion. If it were rigidly enforced in every community, there would be few physicians who would escape penalty, and yet their technical violation of the law is due more often to excusable inadvertence than to positive neglect or evasion of the law. The health officer must depend for his success in disease prevention upon the cooperation of private physicians and he must be tolerant, within reasonable limits, of occasional technical violations of disease notification laws. He must, however, be prompt to take legal action against physicians who per-

sistently or intentionally offend in this respect after the notice has been given them of their delinquency. A single prosecution in such case has a salutary effect; wholesale prosecution might serve only to antagonize many physicians who would otherwise give the fullest measure of cooperation.

Health Officers' Salaries

From the surveys of municipal health administration to which previous reference has been made, the facts regarding health officers' salaries may be briefly summarized as follows: In the 83 cities of 100,000 population and over, 53 health officers were whole-time and 30 part-time officials. The salaries of the whole-time officers ranged in these cities from $2,000 to $10,000 a year, and those of part-time officers from slightly less than $2,000 to between $5,000 and $6,000. The average salaries were $4,840 for the former group and $3,104 for the latter. In the 86 cities from 40,000 to 70,000 population, there were 45 whole-time health officers and 41 part-time officers. The salary range of whole-time officers was from $1,000 to $5,000 and over, and for part-time officers from $1,000 to $5,000 maximum. The average salaries were $3,404 for the former group and $2,459 for the latter.

It would appear from these figures that the amount of time required of the health officer is not a determining factor in fixing his salary. It would also appear that population alone does not determine what his salary should be. Obviously, the general and special qualifications and fitness of the health officer, the salary standards prevailing in the public service of the given community, and the general public's appreciation of health problems and health needs must be taken into account. But whatever conclusions may be drawn from analysis of the facts about the salaries of health officers as reported in these surveys, and whatever may be the special local factors influencing salary rates in public service, the salary of the health officer should be based primarily on the following factors:

1. *The size of the community.*—There are many other factors besides the mere number of people to be considered in determining health needs and the nature and extent of the health organization required, but in American cities, populations of comparable size require much the same character of health protection and much the same type of health organization. The larger the population, the greater the responsibility of the health officer; the greater the health officer's responsibility, the more he should be paid.

2. *The requirement of full-time or part-time service by the health officer.*—This is in a measure dependent upon the size of the community. If it is large enough to need a health officer on full time, the salary offered should be sufficient to make it possible for him to live on it according to standards suited to his official and professional status in the community. The underpaid, whole-time health officer, dependent only upon his salary, who has to struggle to maintain his own self-respect and his respect for public service, is badly handicapped in his effort to secure the respect of his community. If the health officer is a part-time official, his salary should be a reasonable payment for professional service, but the amount of time which he is required to devote to his official duties should be defined as far as possible so that a reasonable payment can be fairly gaged.

3. *The educational and experience qualifications of the health officer.*—The health officer, part-time or whole-time, who has qualified himself professionally for public health work, perhaps at considerable expense, or who has attained competence in such work by long experience, is clearly entitled to higher salary than one who has not so qualified himself. It is a fair assumption, for purposes of salary payment, that the former is worth more to the community than the latter.

Considering only the whole-time health officer, $2,500 represents a reasonable minimum salary, sufficient, however, only for a young man at the beginning of his career as health officer. In cities from 25,000 to 100,000 population, a salary range from $3,000 to $5,000 would meet ordinary requirements. In cities from 100,000 to 500,000 population from $5,000 to $7,500 or more, might well be offered, and for cities above 500,000 population $10,000 or more would not be too much to pay for the right man. As we have said, there are many purely local factors which would need to be considered in making the right salary adjustment, but the responsibilities of the health officer and the high professional qualifications which his work demands should entitle him to rank as to salary with the highest-paid officials of comparable station in the public service.

The salary of the part-time official is, as noted, similarly based upon his professional qualifications, the extent of the demand upon his time, and the nature of his responsibilities. It should be remembered, however, that the part-time official has, in the majority of instances, other sources of income which are not available to the whole-time officer. In small communities, say under 10,000 population, where part-time service is all that is needed,

$2,000 may be regarded as a reasonable maximum. In larger cities, from 10,000 to 50,000 population, where part-time service may meet the need—and there are comparatively few such cities—a maximum of perhaps $3,000 could be justified. In the writer's judgment, however, a salary of $3,000 for part-time health officer service in a city of over 25,000 population would be an extravagance, except for an unusually well-qualified and expert person. In cities of over 50,000 population part-time health officers cannot, under ordinary circumstances, give the community the kind of service it needs regardless of the salary paid.

State Highway Laboratory Makes Tests for Counties and Towns

Laboratories Maintain High Standards for Road Materials

UPON request, tests are made for county and township highway officials in the new laboratory of the Minnesota State Highway Department. This laboratory is claimed to be one of the best-equipped highway-testing laboratories in the United States. All material for use on the state trunk highways is tested here to see that it conforms to the high standards prescribed by the Department. This includes tests of sand, gravel, crushed rock, cement, bridge steel, reinforcing steel, asphalt, road oil, tar, culvert pipe and guard-rail cables. Samples taken from completed pavements are tested to see that the concrete is of the required strength and thickness. Upon request, tests are made for local highway officials so that they may maintain roads under their supervision up to the highest standard.

The laboratory is located in an addition to the Experimental Engineering building of the University of Minnesota. Where special machinery is necessary, as in rock and brick testing, the Department and the University classes will use the same equipment. The chemical and bituminous laboratory is on the second floor, and the physical laboratory and offices are on the ground floor.

TESTING LABORATORIES OF THE MINNESOTA STATE HIGHWAY DEPARTMENT
Physical laboratory; left, bituminous testing laboratory; right, chemical laboratory

In the basement are receiving, sample storage, equipment storage, moist curing rooms, and a large, open room for experimental work. The moist curing room has improved atomizers using compressed air, a high-pressure steam coil for heating, and an automatic temperature control.

Garbage Collection and Disposal in a Town of 12,000 Population

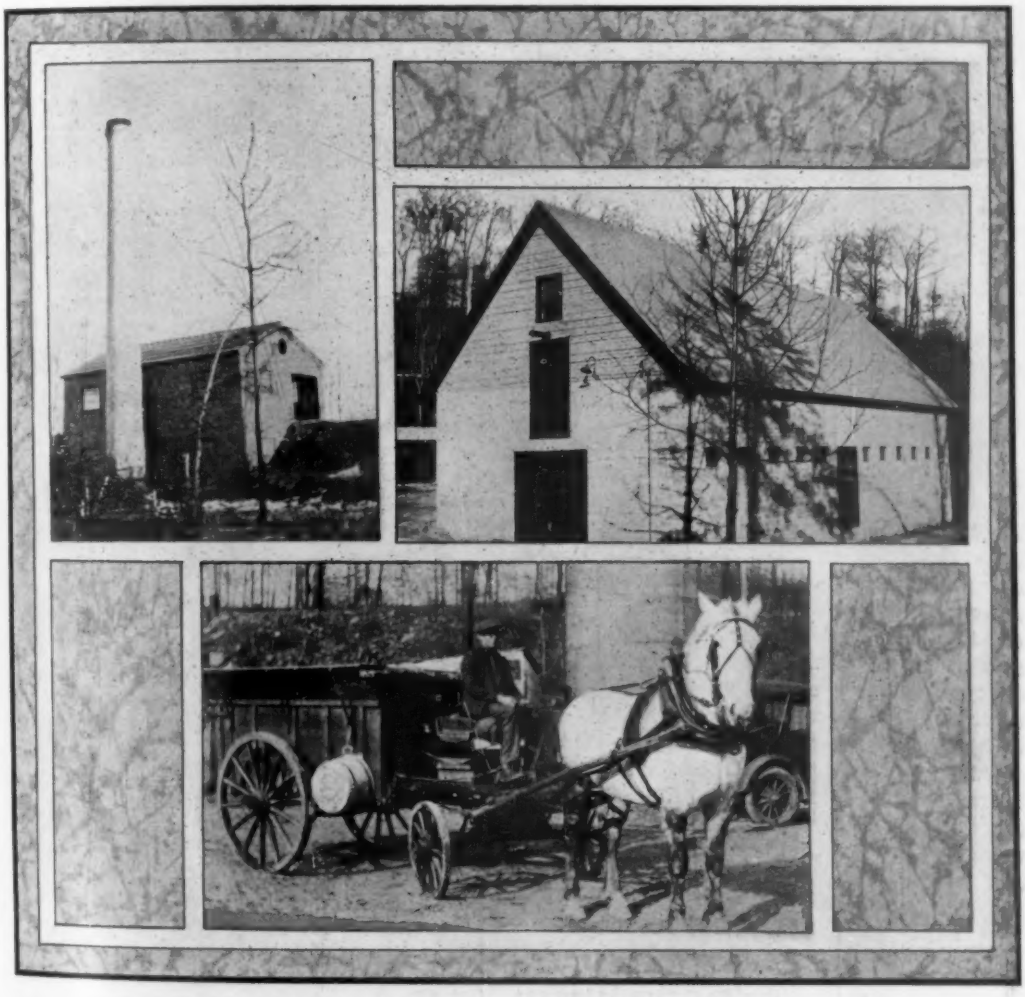
By John P. Broome

City Supervisor, Summit, N. J.

AFTER nearly a year's trial in the collection of ashes, garbage and refuse by horse-drawn equipment, Summit, N. J., has decided that the experiment is successful, both from the service standpoint and from an economical viewpoint. This might not apply to every municipality, for the reason that conditions in Summit are somewhat different from those in many other suburban communities. The country is rolling, the houses in many cases stand from 100 to 300 feet back from the road, and dwellings are sometimes more than a block apart.

Summit is a community of about 2,400 homes, and with a population estimated at 12,000. It is on the line of the Delaware, Lackawanna and Western Railroad, about twenty miles from New York.

The problem of collecting garbage, ashes and rubbish had given the local Common Council much concern. Service cannot be exactly measured in dollars and cents, and it is hard at times to say whether the city is getting its money's worth, but on the whole the authori-



COLLECTION AND DISPOSAL EQUIPMENT AT SUMMIT, N. J.

Upper left, incinerator. Upper right, barn for storage of equipment. Below, horse-drawn collection wagon

ties seem well satisfied with the substitution of horse-drawn equipment for the motor trucks that had been in use many years.

In street work one can figure the exact cost of an improvement against the cost of maintenance, and generally show a saving, but in the collection of garbage and ashes you can cut down on service and save money, or you can give what might be considered "service de luxe" and spend considerable money. Every municipality in the northern part of New Jersey is confronted with a difficult job when it comes to caring for the collection and disposal of ashes, garbage and rubbish.

The city of Summit completed its incinerator or disposal plant early in 1926. Previously, the collections were thrown on what was known as a public dump, but this method was far from satisfactory, with the result that complaints were frequent—for which no one could blame those living in the vicinity of the public dump. The disposal problem was therefore easily solved by incineration, but the collection had been a nightmare to the governing body, a mayor and seven councilmen.

In the latter part of 1925 the city asked for bids for doing the work, collection in Summit by private contractor having been in operation several years. The contractor who had the job was the only bidder. His figure was $47,000 a year on a three-year contract. The Common Council believed it was too high. The bid was rejected and new proposals asked. The second time four or five bids were received; the lowest of these was for $41,000. and the next $47,000. The contract was awarded on the $41,000 bid.

The successful bidder started his contract in February, 1926. He was not familiar with the work, and his equipment was far from satisfactory. In addition to this handicap, a severe snow-storm tied up travel to a greater or less extent. Naturally, complaints came in by the score on account of the failure of the scavengers to get around. After a month of such service the contractor was released from his obligation. He was willing to give up the contract. After considerable debate in the Common Council it was decided that the city could do the work. Parenthetically, it might be stated that while the contractor was doing the work, or at least trying to do it, the city was studying the different methods of collection.

The Special Conditions in Summit

Collections are made from cellars of homes, and in the case of houses which stand back from the road a great distance it can be seen that much time would be lost if the scavenger left his motor truck on the street, went to the cellar to get his load and after dumping it, returned the ash-can or other receptacle to the cellar. This was especially noticeable with ashes. Trucks are expensive and they are expected to function a greater part of the time to make them profitable. A truck in service means the employment of a driver and four men. The driver would be idle, so far as the actual work of collection was concerned. With the houses scattered, only one or two of these men would be working at the same time. Another handicap was that the property owner often would not allow one of the large trucks to enter his driveway on account of the damage that might be done with a loaded vehicle.

After a careful study of every detail, the Common Council acted on the suggestion of the City Supervisor, who was appointed early in 1926, and decided to buy horses and carts, a single horse being put to a cart holding about 3 yards. This raised a storm of objections, many citizens declaring that the city was going backward, that horses and carts were obsolete, and that the only way of collection was by motor equipment. Another argument was that horses and carts were unsightly, compared with trucks.

But the Council was firm in its opinion, and a year's experience has shown the wisdom of its action. We have eight men on garbage and eight on ashes. With the shutting-down of furnaces when spring comes, we lay off the ashmen, or provide other municipal employment for them.

How the System Works

Each man has a definite route and he is responsible to the superintendent of service or the City Supervisor for keeping it clean. He starts at seven in the morning. When he has finished his route, whether it be two, three, or four o'clock in the afternoon, he is through for the day. A check-up is made to see that he performs his work, and that it is not skimped. If a complaint is made by a householder and the complaint is justified, the driver on that particular route is "jacked up." Several of such complaints probably mean his dismissal from the service.

The carts in use were built especially for the service and seem to be satisfactory. They are light enough for one horse, and yet strong enough to stand hard usage. They are equipped with covers which are on rollers, and when a vehicle is full the curtain is rolled over the load to prevent the contents from blowing about the street. This prevention is especially

valuable on a windy day when a wagon is loaded with either ashes or refuse.

The man on the cart drives up to the back door or cellar door of the house, gets his load and then goes on to the next house. Walking, which usually takes up a great deal of time, is curtailed. With motor trucks the scavenger lost a great deal of time going for his load, returning with it, and then replacing the ash-cans in the cellar.

What is true of the ash collection is equally true of the garbage service. There was some difficulty in getting everything systematized and in laying out routes so that each man had about the same amount of work to perform. When we found that one route was lighter than another, we made adjustments, until we thought the system was about as good as could be devised.

In making up the municipal budget for 1927, the sum of $41,000 was set aside for municipal collections. An outside contractor would have charged us $47,000 a year for the same work we are doing for $6,000 a year less. I feel that we will have a balance at the end of the fiscal year. Of course it must be considered that the community is growing, that apartment houses are coming in, and that many new homes are going up every year.

An Experiment

After we were well organized and the service was functioning satisfactorily, a manufacturer of a patented garbage and ash truck tried to interest us in his vehicle, claiming that he could save the municipality considerable money. One claim was that he could do the work for $25,000 a year with his present truck. His proposition on the surface looked inviting to the governing body, which figured that if it could save the taxpayers $16,000 a year it was morally bound to give the trucks a trial at least. The manufacturer declared that he could do the work with two of his patented trucks and eight men. He was so insistent that the Common Council told him to go ahead and prove the worth of the vehicles, the understanding being that if the trucks did the work claimed for them by the manufacturer, the city would obligate itself to buy two of them.

The city was to get three collections a week, the same as it was receiving by the horse-drawn equipment. The experiment showed this result: The truck with four men covered no more ground than did the horse and cart with one man; it did the work in two-and-a-half hours, whereas the man with the horse and cart did it in four hours. The truck is made of metal and covered. There is no way whereby the men on the truck can get inside and stamp down or compress the load of rubbish, as can be done with one of the open carts.

The truck on ashes worked much better, but it did not cover much more ground than did the one horse and cart. When we found that the trucks were not cleaning up the city as it was contended they would do, the service was supplemented by our own horse-drawn equipment.

It is only fair to say that I believe in many places the trucks would be more economical than is the horse equipment. Keep in mind that our collections are from the cellar. With curb collections where the garbage and rubbish are separated I believe that the patented trucks will do all that the manufacturer claims, but, as I said before, conditions in Summit are widely different from those in other places where it is contended these trucks are proving their economy. It is certain that they save a lot of lifting. The garbage or ashes are thrown in a trough that lets down the side, and when this is filled the trough is raised by the car machinery and dumped automatically into a large hopper.

Fifty Front Feet of Business Property Recommended for Each 100 Expected Population

BELIEVING that there is a definite relationship between population and the amount of property which ought to be zoned for commercial use, the Chicago Regional Planning Association has been compiling statistics as to business property now in use in 28 cities and villages in the region of Chicago.

In an article by Robert Kingery, Secretary of the Association, in THE AMERICAN CITY for February, 1927, a preliminary table was published. The figures have since been revised as of July 1, 1927, and are obtainable in blueprint form from the office of the Regional Planning Association, Burnham Building, Chicago. The document embodies the following conclusions and recommendations:

"Approximately 50 feet of business property in use by every 100 people in the 28 cities and villages measured.

"The character of the community (industrial or residential) has little effect on the amount of business frontage in use.

"The size of the community makes little or no difference in the relation between population and business frontage.

"Generally, the greater the distance from Chicago, in miles and minutes, the greater is the amount of business frontage per 100 people.

"It is recommended that subdividers and zoning authorities adopt the figure 50 front feet of business for each 100 expected population as a basis for platting and for zoning business property."

Double Coagulation for Turbid Waters

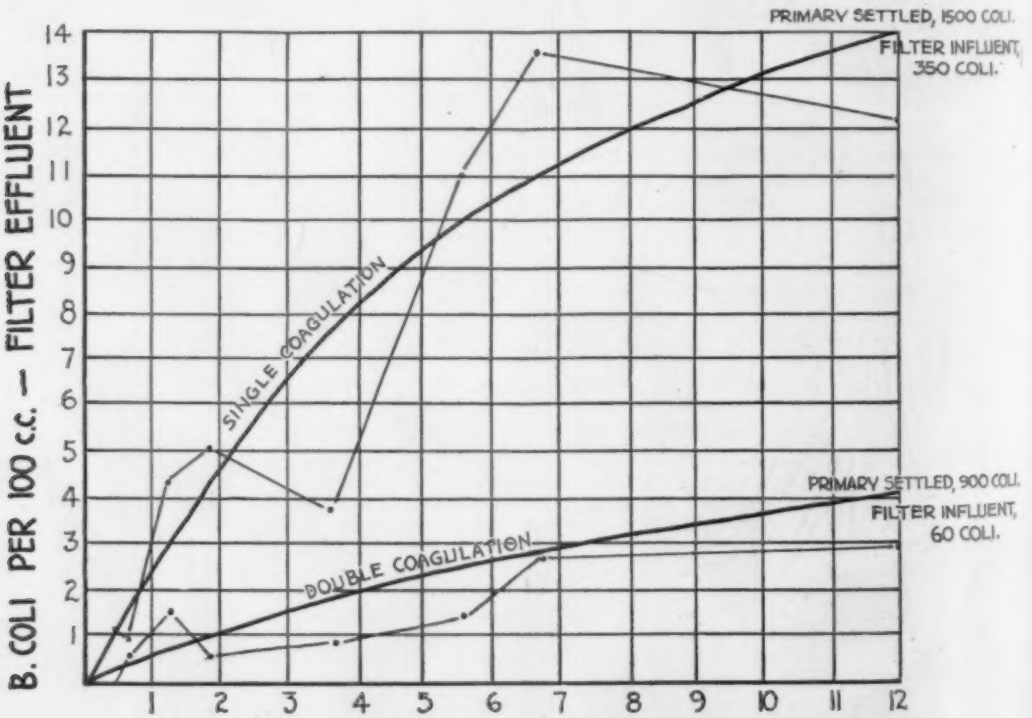
By C. Bahlman and E. B. Evans

Chief Bacteriologist and Assistant Bacteriologist, Respectively, Filtration Plant of the City of Cincinnati, Ohio

DOUBLE coagulation has been used with success at Portsmouth, Ironton and smaller towns in Ohio. At the suggestion of the Ohio State Department of Health, this method of treating turbid waters has been tried at Cincinnati. The system used for purifying the Ohio River water at Cincinnati may be briefly summarized thus: preliminary sedimentation for 72 hours; coagulation with lime and iron sulphate, followed by five to eight hours' sedimentation; filtration through mechanical filters at the rate of 125 million gallons per day; and chlorination. An idea of the quality of the water at the various stages of purification is given in the following averages: river water, 300 p.p.m. turbidity and 2,000 coli per 100 c.c.; effluent from primary settling-reservoirs, 70 p.p.m. turbidity and 400 coli; filter influent, 17 p.p.m. turbidity and 85 coli, The filter effluent has varied little from an annual average of 4 colon bacteria per 100 c.c. With excessive raw-water pollution, monthly averages sometimes reach 10 or 15 coli, and for weekly periods a coli index as high as 30 per 100 may be shown by the filtered water. Chlorination, therefore, is essential to the production of a uniformly satisfactory output. It has been the custom at the Cincinnati filtration plant to use enough chlorine to yield 0.01 to 0.04 p.p.m. residual chlorine after five hours' contact. This has yielded a final output which for many years has averaged well under the 1 B. coli standard.

Reasons for Investigation

The principal reasons for investigating double coagulation were to determine: (1) whether a satisfactory water could be produced without chlorination, so that phenol tastes might be eliminated by temporary suspension of the disinfection process; (2) whether the double coagulation process would introduce additional safeguards in plant operation, so that the chlorination process would become more truly a factor of safety; (3) whether the quality of the plant output could be improved; (4) other advantages, such as lengthened filter


PRIMARY SETTLED, 1500 COLI.
FILTER INFLUENT, 350 COLI.
SINGLE COAGULATION
PRIMARY SETTLED, 900 COLI.
FILTER INFLUENT, 60 COLI.
DOUBLE COAGULATION
B. COLI PER 100 c.c. — FILTER EFFLUENT
1 2 3 4 5 6 7 8 9 10 11 12 13 14
1 2 3 4 5 6 7 8 9 10 11 12
B. COLI IN RAW WATER — THOUSANDS PER 100 C.C.

COMPARISON OF THE EFFECTIVENESS OF SINGLE AND DOUBLE COAGULATION

TABLE 1—SUMMARIZED COMPARISON OF SINGLE AND DOUBLE COAGULATION

	Single Coagulation	Double Coagulation
Turbidity—		
Raw water	470.	480.
Effluent primary reservoirs	100.	21.
Effluent secondary basins	19.	11.
20°C. Bacteria—		
Raw water	30,800.	30,800.
Effluent primary reservoirs	5,650.	3,360.
Effluent secondary basins	860.	800.
Filter effluent	96.	90.
Chlorinated	27.	31.
B. Coli per 100 c.c.—		
Raw water	5,075.	5,145.
Effluent primary reservoirs	820.	130.
Effluent secondary basins	175.	39.
Filter effluent	8.30	1.54
Chlorinated	.70	.12
Chemical Doses—		
Primary, g.p.g. alum	..	.76
Secondary, g.p.g. CaO	.80	.67
Secondary, $FeSO_4$ g.p.g.	1.56	1.11
Secondary, p.p.m. chlorine	.20	.23
Cost of Chemicals per m. g.	$2.38	$3.24
Additional Cost of Double Coagulation—		
Per m. g.	..	$.86
Filter Service—		
Hours	27.3	35.8
Increase due to double coagulation (per cent)	..	31.1
Per cent wash water	1.38	1.13
Saving due to double coagulation (per cent)	..	18.1

runs with decreased wash-water demands; and (5) relative costs of single and double coagulation.

Because of the cheapness of iron sulphate as compared with alum, the use of the former coagulant in the primary reservoirs was worthy of trial. This considerably lessened the load upon the secondary processes, but it soon was apparent that very much better results were obtained by the use of alum than from a dose of iron sulphate of equal cost.

Alum, consequently, was used thereafter. It was applied to the force mains at a point 2,100 feet from the place where the water is delivered into the primary settling-reservoirs. The duration of each experiment varied from four to seventeen days, not less than 50,000,000 gallons being treated each day. The results obtained while using the primary coagulant were compared with data obtained by single coagulation upon water of comparable nature.

Results

The individual experiments cannot be discussed separately in this abstract. The accompanying table is a composite of the six experiments in which 1,100 or more coli per 100 c.c. were present in the raw water. A general comparison of single and double coagulation performance is available from this table. It will be seen that the deposition of turbidity, 20°C. bacteria and coli in the preliminary basin are greatly increased when a primary coagulant is used. The turbidity after primary coagulation is of about the same magnitude as the filter influent in ordinary operation, while the coli density is even less than arrives at the filters in single coagulation. The turbidity and coli load applied to the filters consequently is very much decreased by the two coagulations. Longer filter runs are possible and the coli content of the filter effluent is greatly improved. The 20°C. counts, except after the primary coagulation, were not benefited to any great extent, however, by the double process.

Table 2 gives the coli results from eight alum experiments. These may be discussed from their bearing upon three important questions as follows:

1. Does Double Coagulation Introduce Additional Safeguards in Plant Operation?

When the double process is used, the coli content of the filter influent almost always will be under 50 per 100 c.c. and never will exceed this number to any great extent. Peak loads coincident with a rise in the river may be annihilated in the preliminary reservoir by the primary coagulant. In several experiments the secondary basins and the filters had less work to perform during a period when the river was flooded, than during normal conditions of single coagulation. The diagram shows that a filter effluent not exceeding 4 coli per 100 c.c. may be expected from a raw water showing 12,000 coli if double coagulation is practiced, whereas, with single coagulation, the filter effluent would have contained in the neighborhood of 14 coli per 100 c.c. In the double process, therefore, the filters operate under lighter burdens, and produce a more uniform water prior to chlorination. Plant operation becomes more pliable and responsive to control, all of which means that a highly, desirable additional safeguard is introduced.

2. What Is the Effect of Double Coagulation upon the Quality of the Final Output?

With the same residual quantities of chlorine, the chlorinated water after double coagulation in all instances has shown a lower colon index than in single coagulation. The difference probably is more a matter of figures than

TABLE 2—RECAPITULATION OF COLI DATA IN SINGLE AND DOUBLE COAGULATION

B. Coli Per 100 C.C.

		Effluent from Primary Reservoirs		Filter Influent		Filter Effluent		Chlorinated	
Exp.	Raw Water	Sgle.	Dble.	Sgle.	Dble.	Sgle.	Dble.	Sgle.	Dble.
3	450	71	31	40	20	1.00	.00	.00	.00
2	530	52	6	40	6	.85	.50	.05	.00
7	1,100	275	65	65	55	4.42	1.40	.08	.00
11	1,800	620	165	64	22	5.00	0.59	.35	.06
1	3,550	780	23	210	36	3.70	0.86	1.30	.00
4	5,400	850	170	165	37	11.00	0.80	.83	.00
8	6,700	820	220	345	54	13.57	2.67	.30	.00
5	12,000	1,590	140	220	29	12.10	2.90	1.32	.64

of sanitary significance as long as the raw water index does not exceed 3,500 per 100 c.c. With greater pollution, however, there is more significant deviation between the coli indices in single and double coagulation. A standard chlorinated plant output under extreme raw-water pollution may be guaranteed if double coagulation is available. This is not possible under single coagulation unless materially greater quantities of chlorine are applied.

3. Does Double Coagulation Without Chlorine Afford Adequate Protection to the Consumer?

From raw waters which do not exceed 5,400 coli per 100 c.c. the double process was able to produce unchlorinated water which would have been deemed satisfactory on the basis of the 1914 Treasury Department standards. With heavier initial pollution, especially in midwinter, it was impossible to meet the 1914 specifications, although the most unfavorable record was no higher than 2.9 coli per 100 c.c.

In three of the experiments, it was impossible to conform to the present 1 B. coli standard; therefore it must be stated that double coagulation without chlorination does not afford adequate protection when the degree of pollution is such as that of the Ohio River. This in no way detracts from the usefulness of the process when used in conjunction with chlorination. Because of the very much lower colon content of the water coming to the secondary basins when using the primary coagulant, it has been possible to produce a coli-free water by increasing the lime doses to the point of showing 1 or 2 p.p.m. of causticity. Many experiments have demonstrated the reliability of this combined double coagulation and increased lime treatment, and these were confirmed when phenol tastes appeared in the water and chlorination was suspended. The tastes disappeared within 48 hours after elimination of the disinfectant, and for eight days the water throughout the entire city was coli-free in 5 10-c.c. portions tested from four or five samples per day from different parts of the city. The combined double coagulation, excess lime treatment, therefore, was successful in sparing the consumer considerable discomfort without any depreciation in the quality of the water.

Filter Runs Increased

The decreased loads coming to the secondary processes made it possible, except during the winter, to increase the filter run by 30 to 65 per cent, thereby saving from 25 to 40 per cent wash water. With ice in the reservoirs, however, no great saving of wash water was possible. The advantages of double coagulation then seemed to be confined to the bacterial aspect, since the filter run, the wash-water demand and the doses of secondary chemicals were little different from those in regular operation.

Savings in Chemicals

Except under winter conditions, the application of the primary coagulant has always made possible the saving of varying amounts of secondary chemicals. Often the total quantity of the three chemicals used in the double process was less than the total of the two used in single coagulation. With very high raw-water turbidity, this was not the case, although the excess due to practicing double coagulation was never very great.

It seems, then, that for plants using alum as the coagulant, the splitting of this into primary and secondary applications should entail little, if any, additional expense. In Cincinnati, the double process involves additional expense because it was impossible to save enough of the cheaper lime and iron to balance the cost of the more expensive alum used. The maximum additional cost was $1.52 and the average 86 cents per million gallons. If used, as believed to be advisable, for about 40 per cent of the time, the additional cost in Cincinnati would be $6,500 per annum, equivalent to 36 cents per million gallons distributed over the year's output. This additional expense is not prohibitive in view of the many obvious advantages of the double process.

ACKNWOLEDGMENT.—From a paper read before the American Water Works Association Convention at Chicago.

Massachusetts Realtors Approve Park Dedication by Subdividers

IN line with the growing tendency of subdividers to provide park and playground space in new developments, as described in the article, "Subdividing for Play," in THE AMERICAN CITY for August (pages 140-146), is the following recent item from the news service of The National Association of Real Estate Boards:

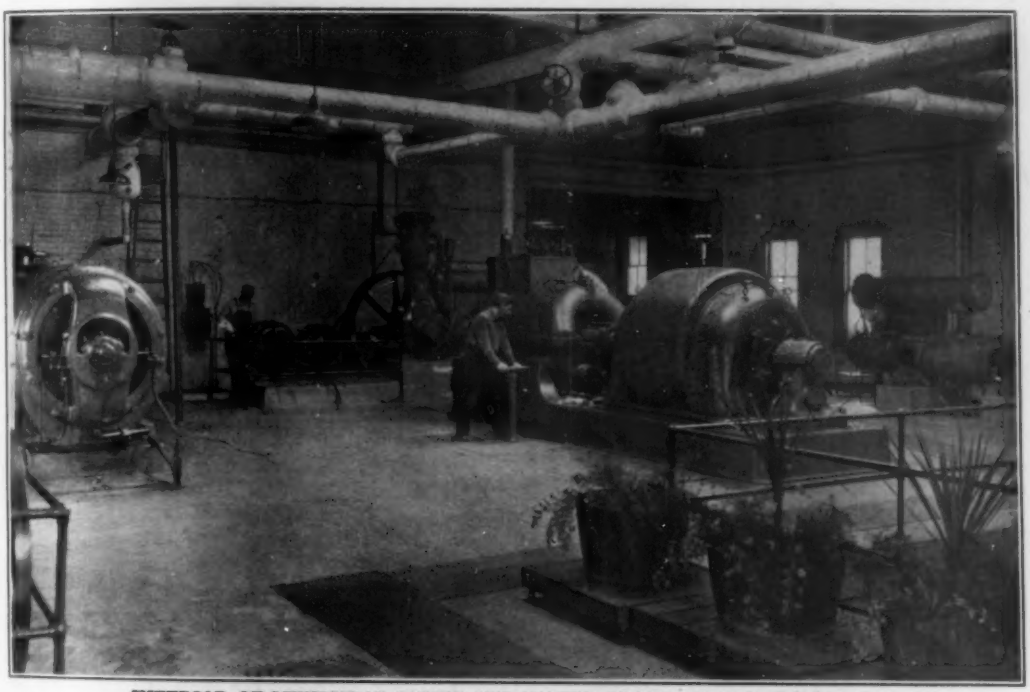
"Dedication of a portion of new subdivisions for park, playground and community recreation purposes is approved by the Massachusetts Association of Real Estate Boards in a resolution passed by its board of directors.

"Acquisition of necessary park space and establishment of an adequate playground system are often hampered by the high cost of acquiring land for reservation use in growing cities where no provision is made at the time of platting the subdivision, the Association points out in indorsing the plan of allotment by developers of portions of new city areas for community recreation purposes."

The Municipal Light and Water Plants of Bluffton, Ind.

By T. R. Johnston

BLUFFTON, known as the "Parlor City of Indiana" because of the fact that even back in 1900 it had the highest percentage of paved streets of any city in the state, has always displayed no small amount of civic pride. Fine streets and attractive homes have been two sources of this pride, but in the last several years the city-owned water and light plant, with about the lowest rates in the state for a city of Bluffton's size, has occasioned just about as much home-town boosting as any other one thing.



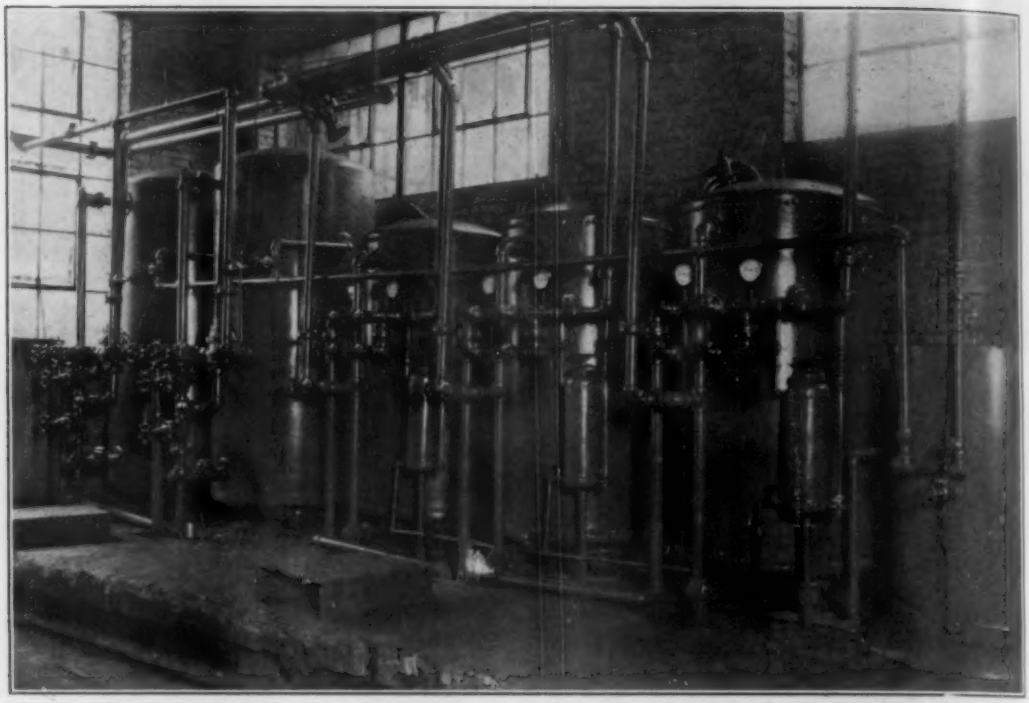
INTERIOR OF MUNICIPAL LIGHT AND WATER PLANT AT BLUFFTON, IND.

The machinery shown from left to right are a 600 Kw. G. E. generator, Sullivan electric-driven air compressor, 1000 Kw. Westinghouse generator and Worthington steam-operated Uniflow air compressor

In September, 1886, the city installed its own water-works system at a cost of $17,755, having then only 2¼ miles of water-mains and 30 fire-hydrants. The electric light plant was established by private capital a few years later, only for street-lighting purposes, but after operating about five years was purchased by the city and moved to the site of the water-works plant near the corporate limits. About a quarter of a century ago the plant was enlarged to take care of commercial and industrial lighting and power. From that time its growth has been gradual year by year. The combined plant valuation in 1926 was $522,995.43. This is divided between the light plant at $325,912.26, and the water-works at $997,083.17.

The municipally owned plant has suffered from depressions, much the same as any other business, but in spite of minor difficulties it has prospered. Municipal ownership was continued despite offers from many of the utility companies which were coming into existence in the Middle West rather rapidly.

In 1914 the plant, which had been just about paying expenses, was put in charge of C. W. Clark, who had been superintendent of a traction line operating into Bluffton. Clark began by scrapping some of the old machinery and installing more up-to-date equipment. At the same time he introduced various changes which started the plant on the road to becoming a paying business. This action put the plant "over



WATER SOFTENERS AND FILTERS USED AT BLUFFTON, IND., WATER-WORKS FOR RIVER WATER USED IN BOILERS

the hump," so to speak, and from then to the present time it has been on the up-grade. A 600-kilowatt General Electric generator was installed in 1914 and a 1,000-kilowatt Westinghouse generator in 1921, so that if one is out of service the other is ready to operate.

J. S. Gardner succeeded Clark as superintendent in 1918. Three years ago, the present superintendent, Ed Hans, assumed charge. Mr. Hans has superintended extensive repairs and replacements. Practically $40,000 was spent for new machinery and equipment, which included a battery of five water-softening tanks with filters, from the Wayne Tank and Pump Co., of Fort Wayne, Ind. These tanks have a daily capacity of 50,000 gallons and fit the river water for the plant boilers. One large smokestack was installed in place of three smaller ones, and other changes made to eliminate waste.

Both pumps are electrically driven, and two more, authorized in May by the City Council, will be driven the same way. The Worthington Uniflow air-compressor installed in 1921 is driven by steam, while the Sullivan air-compressor is electrically driven. The three Sterling boilers, of 300 horsepower each, are hand-fired. The success the plant has enjoyed has been due to the sympathetic cooperation of the Mayor and the Council and the faithful work of the employees.

Expansion of Business

The expansion of business has been constant during the last six or eight years. Rural lines are supplying service to a growing list of farmer patrons. This city-owned light plant is keeping pace with privately owned concerns in extending its lines and service to the large group of farm folks who really are part of the Bluffton community in Indiana. The Public Service Commission keeps pretty close watch of city and utility affairs, and a report to this Commission last November asking for transfer of funds to help pay for a new community building, gives the following statement on earnings, expenses and depreciation for the last six years:

Gross Income	
Last 6 months of 1921	$ 47,512.74
For year 1922	98,223.19
For year 1923	112,202.81
For year 1924	103,879.47
For year 1925	83,043.61
For year 1926	88,210.51
Current Expenses	
Last 6 months of 1921	$ 28,553.66
For year 1922	57,595.57
For year 1923	65,084.82
For year 1924	68,451.68
For year 1925	52,981.14
For first 10 months of 1926	50,880.83
Depreciation	
Last 6 months of 1921	$ 4,445.72
For year of 1922	10,765.07
For year 1923	10,482.84
For year 1924	10,234.30
For year 1925	11,408.17
For first 10 months of 1926	8,247.41

Reports January 31, 1927, indicated that the city light plant had approximately $30,000 in its depreciation fund, enough to take care of any ordinary event, and a surplus of nearly $10,000, and had paid in cash $55,000 of the $120,000 due on the community building. The profits of the light and water plants have continued large and in 1926 they earned $29,082.27, nearly $10,000 more than in the previous year, and prospects are for as large a business the current year.

The Bluffton home lighting rate is 6½ cents per kilowatt-hour, going as low as 4 cents when more than 400 kilowatt-hours are used. The power rate for city industries ranges from 4½ cents to as low as 2½ cents, and the rate on rural lines is from 7½ cents to 12 cents, with 20 per cent discount on farm lines if bills are paid within ten days. The city patron discount is 5 per cent.

City Water Plant

The water rate was formerly $6 a year, and the water business generally showed a loss. Three years ago the rate was boosted to $9 minimum a year, still a small figure when compared to the average city rates. Since then the water-works has shown a substantial profit. Its patrons have grown from a few dozen when the system was started in 1886, to more than 1,450, with 10 miles of water-mains. All services are metered.

Seeking "The One Best Pavement"

By H. J. Baum

City Engineer, Altoona, Pa.

EVEN before the officials in that little German village agreed "to get our heads togedder and make us a block pavement," the question of the "best *kind* of pavement" had become perplexing in many municipalities. If there were only one best pavement, the problem would be easier than pondering upon "Concrete for Permanence," "Select Asphalt Base for Durability," "The Vibrolithic Method," "Vitrified Brick Outlasts the Bonds," "Warrenite-Bitulithic—the Best by Every Test," "Kyrock—the Perfect Pavement," "Granite Lives Forever," "From Mastodon to Motor—the History and Romance of Asphalt," etc., etc. It becomes apparent that the problem is too big for one luncheon and that sufficient tobacco smoke cannot be produced in any one meeting to bring much enlightenment on this all-absorbing subject.

The idea gradually evolves into a desire for outside information, and a questionnaire is sent to many city engineers over a wide area, asking each one's opinion as to the kind of pavement he would recommend, its expected life, service, etc.—the sum total of each professional man's life experience in paving to be expressed in a few words to decide the all-important question of that "one best pavement."

Why are *pavements* permanent? "Clothes wear out, automobiles depreciate, houses need paint and show signs of wear and tear; even our bodies age in time, and the succeeding generation soon has us slated for the shelf. "Permanency" is the one fallacy in the theory of solution. The question is simply one of time, and the speed of going is determined very largely by adequacy of design, thoroughness of subgrade preparation, selection of materials, care in construction, character of use, climatic effects, and the ensuing care through the years continued that should save the surface.

Paving service at a minimum cost is the problem of the trained municipal engineer, and those cities fortunate enough to have trained engineers of wide experience in paving types and paving service are in a position to make the most logical selection of desirable types for each specific location and traffic requirement. It does not follow that a type recommended will be equally successful in another locality where traffic conditions may be different, where the subgrade may be less stable or more poorly prepared, where materials used are of inferior quality and the workmanship of lower order. Service must be built into a pavement in all its many steps by the intelligent and conscientious care of the guiding mind—a processing responsible for the success or failure of every type which enjoys a wide use today.

There are still persons who seek valuable medical advice from those who were cured, only to find that what will cure one person may kill another who is suffering from a similar set of symptoms. It seems just as logical to seek engineering advice from distant points

where obviously no opportunity is given for the personal observation and inspection of the many factors that enter into a proper selection of paving types, as it is to hope for a successful remedy from a distant physician who is prescribing on the basis of someone else's interpretation of symptoms. Not that there is any aversion among engineers to speaking of their paving experiences within their own municipalities, but there is the most evident hopelessness of their being able to give the desired information without knowing the local conditions.

Competent Advice

There are many engineers in the municipal and consulting service who have spent the greater part of their careers in the study of all pavements and who can advise competently as to "the best pavement" for the specific use to which it is to be subjected. The cost of competent advice is the smallest item of all, and the lack of right guidance in the selection of types and the lack of right supervision in the construction are jointly responsible for a very great number of failures. For the want of intelligent direction and construction, the life of the entire improvement is shortened. For the saving of a small fraction of cost in engineering guidance and control, the entire investment in paving is imperiled.

Paving costs are not large when compared with the investment in the improved section. It would interest many a resident owner to know that the fee he paid for the privilege of buying an inside property amounted to more than the entire cost of his paving, and yet there is no quarrel with the real estate man about the amount of his charge for the selling service. Paving totals, however, mount into staggering sums, and the first cost is not the last cost.

Many interested parties are eager to give favorable advice tending toward the use of their products, but the only safe procedure for those who must seek advice is to consult some reputable engineer of wide paving experience who, after studying the local situation, can advise impartially as to the types that will best suit the needs of the community. The responsibility of the local official after the selection of the "one best type," instead of being finished has only begun, and not until the work is completed under the most intelligent and exacting supervision, can there be any assurance that the goal of "The One Best Pavement" has ultimately been reached.

Five-Cent Fare Made Available to Holders of Weekly Passes

THE Northern Texas Traction Company, of Fort Worth, Texas, with the consent of the City Council, has recently instituted a new scheme of fare-paying, along with an increase in unit fares, in an effort to bolster up its revenue without losing traffic, which was already at a low point. The former fare was 7 cents straight for adults and 3½ cents for children, with a 10-cent fare on motor-busses. The new fare schedule, which was approved on February 1, provides for a 10 cent cash fare on the street-cars; three tokens for 25 cents, thus amounting to 8⅓ cents each; half fares for children, 5 cents cash with six tokens for 25 cents; and a weekly pass costing 40 cents which entitles the holder to ride for 5 cents a trip. The straight 10-cent bus fare, with transfers, is retained.

This form of weekly pass is a new departure. The form that is sold for an initial sum, sometimes as low as $1.00 but frequently in the neighborhood of $1.25, and entitling the holder to ride during a given week without further charge, is met with in many localities.* The psychological appeal and the convenience of the 5-cent fare are universally recognized. The combination of the weekly pass and the 5-cent fare in the Fort Worth experiment is meeting with much interest in the street-railway industry.

An intensive campaign of education and sales was put on by the company, including the free distribution of an explanatory pamphlet containing a reproduction of the pass which was honored for a period of about 4½ days. Sales of passes for the following week exceeded expectations, reaching almost 8,000 in number. The free demonstration, which in effect was a trial of a straight 5-cent fare, is stated to have been accompanied by an increase of 10 per cent in riding and a decrease of 20 per cent in revenue.

In the April issue of *Electric Traction* there appeared letters from four electric-railway officials in various parts of the country, commenting on the above scheme as described in the previous month's issue. They were guardedly favorable to the idea, at least as compared with the other form of weekly pass, particularly from the standpoints of more tangible revenue and easier passenger registration. Vice-President Blackhall of the Chicago & Joliet Electric Railway Co. stated, however, that he preferred a monthly to a weekly pass, his company having used such a monthly pass since 1922; it is sold for 75 cents and entitles the holder to ride for 5 cents instead of 10 cents, the saving to the rider beginning after fifteen rides in a month, while at 50 rides per month the fare averages 6½ cents. He believes that the lower rate obtained by the monthly pass, as compared with what could be charged for a weekly pass encourages more rides, besides being more convenient to patrons.

On May 1 the Tacoma Railway & Power Company, of Tacoma, Wash., adopted a pass similar to that of Fort Worth, charging 30 cents instead of 40 cents, however. Houston, Texas, is also reported to be considering a weekly pass on the above principle.

*See "What Fares Are Best?" by Walter Jackson, in THE AMERICAN CITY, November, 1926, Page 669.

Roads and Snow Removal

By John H. Wertley

THE importance of good roads to every industry in this country cannot be exaggerated. Every mile of improved road puts dollars in the pockets of business men, manufacturers, merchants, workers, professional men, farmers, cities, towns and rural communities.

In the areas congested with snow in winter, highway departments have taken preventive measures against the drifting of snow onto the roads, by the erection of temporary snow-fences on the windward side of the highway. These have given good results in some places. This plan is expensive, as it means the purchase of fences, cost of erection, ground rentals, damages and cost of removal. In spite of all this fence protection, roads in many places are still drifted to a depth of 12 feet and the fences blown over.

During last winter there were two severe snow-storms which have shown the value of snow removal by means of tractors. The roads were covered with four or five inches of solid ice before the first blizzard, which made it necessary to use a snow-removal outfit that was positive in its traction. Drifts from four to seven feet deep were encountered, but in every instance they were opened quickly by the use of a Model-A 30 Cletrac, equipped with ice-grousers.

In many localities it is thought necessary to start work while the snow is falling and during the storm. In many cases, however, these roads are closed in spite of such battles, which usually are not continued because of the discomfort to the men, and the trips are not frequent enough to keep the roads really open. Snowdrifts in such places can be opened in very short time after the snow has stopped falling, if proper methods are used.

The prime factors of a good tractor to open snowbound roads are speed and drawbar pull.

OPENING A 4-FOOT SOLIDLY FROZEN DRIFT OF SNOW WITH CRAWLER TRACTOR

No slow tractor is very effective, even of the crawler type. It should develop as high a drawbar pull as possible on high speeds. The tractor's ability to push snow is also governed by the power that it is able to develop on the turn. In other words, when operating at high speeds, it is possible to use a high and narrow snow-plow which will go through deep snow and yet which is able to widen the swath by plowing another half plow width. Drifts two and three feet deep have been plowed from gutter to gutter with seven-foot plows.

One of the worst blizzards of the winter came after three weeks of mild weather, which

HEAVILY DRIFTED ROAD EASILY OPENED UP FOR TRAFFIC BY CRAWLER TRACTOR AND SNOW PLOWS

had caused the frozen dirt roads to open and had left them with a foot of impassable mud. Then along came the blizzard, closing every road and by-road in the community, to a depth of 12 feet in some places. This made it particularly difficult to operate a tractor of over 5½ tons in one foot of mud and pushing eight feet of snow packed and full of sleet. The work was handled very satisfactorily with a crawler tractor, as it was necessary only to keep the snow-plow out of the mud.

In many townships where snow has been shoveled by hand, the cost of removing the snow has been about $2,000 for two blizzards in one season. This price is about half the cost of a good tractor outfit, which can be used for many years and thus save thousands of dollars. It gives the road engineers the advantage of having the job done more completely and the roads cleared clean and thoroughly opened even where the snow is not deep but is troublesome to drive over. The formation of ice is prevented by keeping shallow snows plowed from the highways and thus preventing the disintegration of the roadbed caused by the rutting of snow and ice.

Shall Firemen Perform Traffic Duty?

A STUDY has just been made by the New York State Bureau of Municipal Information as to the practice of the cities of the state in having firemen perform traffic duty, and as to the attitude of fire insurance companies in cities where such work is a part of the duties of the fire-fighting force.

Of the 55 cities which responded to the Bureau's request for data, 47 reported that they have no firemen performing traffic duty. A summary of the replies of the other cities follows:

ALBANY.—Five firemen are employed on traffic duty. City has had no increase in insurance rates and no such increase has been threatened as a result.

BEACON.—Twelve firemen are employed on traffic duty on alarm of fire only and no increase has been threatened as a result.

BUFFALO.—City has a few firemen, who are unfit to do fire duty, detailed to traffic duty. Chief Hedden says: "Nevertheless, insurance companies are very much worried, wondering where it is going to end. Personally, I am opposed to any such thing, as a man on traffic duty, half a mile away, might as well be in Ireland."

CORTLAND.—Fifteen firemen do traffic duty during alarm of fire only. No increase has been threatened.

JAMESTOWN.—Eight men are on traffic duty during school term. Four men are checking parked automobiles. Insurance companies have threatened to increase rate 4c on each $100 as a result.

MIDDLETOWN.—Twenty-one firemen are sworn in as police officers who do traffic duty at fires only. No increase in insurance rates or any threat to do so as a result.

RENSSELAER.—One fireman does traffic duty during school months between hours of 11:30 A. M. to 1:00 P. M. and 3:30 to 4:00 P. M. No increase has been threatened as yet. This traffic duty of this fireman has been going on for about two seasons.

SARATOGA.—No firemen are doing traffic duty, but they attend to beacons and traffic signs. The electrician and one man are employed for this purpose.

What Denver is Doing to Abate Smoke

By Charles B. Roth
Denver Chamber of Commerce

IN 1922 the city of Denver stood at thirty-seventh place among the 150 cities inspected by the Government to determine the prevalence of smoke—not a very high position. In 1925, when another test was made, Denver was in the eighteenth place.

For Denver to have jumped from thirty-seventh place to eighteenth in three years' time is perhaps not a remarkable record, but the fact in this case is that the improvement was made in less than a year, because intensive smoke abatement work has been carried on only since the first part of 1925. Furthermore, in making this improvement Denver was competing with practically all other cities of size in the United States, as all cities have smoke ordinances which they try to enforce.

No Government report has been made since 1925, so that it is not possible to tell where the city of Denver stands now; but the work of abating smoke has gone on more intensively than ever before since the last report was made, and probably when the next report is made Denver will occupy a place even higher on the scale.

PICTURES FROM THE LOG BOOK OF THE SMOKE DEPARTMENT OF THE CITY AND COUNTY OF DENVER, SHOWING THE KIND OF EVIDENCE COLLECTED IN SMOKE ABATEMENT WORK

The Denver smoke ordinance took effect in 1917; but until the last two years it was allowed to languish. Denver, formerly a clean city, had by that time become a very smoky city.

The man chiefly responsible for the work that has been done is Jay T. Williams, Chief Building Inspector. When Mr. Williams took office in 1923 one of his first tasks was to prosecute smoke abatement. The work has been done through a combined body consisting of a smoke Commission, representing the City and County of Denver, and a Smoke Committee of the Denver Chamber of Commerce. It has already been so marked that citizens have noticed the difference in the amount of smoke clouding the city now, compared with that of a few years ago.

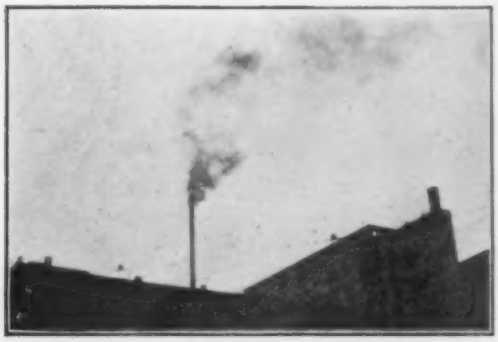
The work done by the Smoke Department in causing smoke prevention devices to be installed is interestingly expressed in figures. During 1925 there were the following results: 38 stokers were installed in 30 plants; 16 plants had mechanical doors applied to 26 boilers, 6 plants equipped 12 boilers with patent steam devices; 102 extensions were placed on flues; 52 defective flues were repaired; 1,023 inspections were made; and 50 boilers were reset.

During 1926 there were the following results: 77 stokers were installed in 65 plants; 6 plants installed steam jets; 6 plants became gas-burning; 200 oil burners were installed under low pressure plants and hot air furnaces; 76 extensions were placed on flues; 24 defective flues were repaired; 1,159 inspections were made and 65 boilers were reset.

The Smoke Department of the City and County of Denver, the Department which is responsible for carrying out the details of the smoke program, works under a system hard to improve. There are three men in this Department—Mr. Williams, a chief boiler inspector, and a smoke inspector who does nothing but devote himself to overcoming the smoke evil in Denver.

The Commission's Procedure

In order to have as effective a record as possible, particularly when necessary to confront a building owner with the facts, the Department keeps a log of each building, showing the results of an inspection of the heating plant,



A REFORMED SMOKESTACK

This stack was one of the worst offenders in Denver. The building was old, the heating equipment ancient; it smoked continuously. The second picture shows what results were accomplished by the Smoke Commission

the kind of fuel used, the mode of stoking and the results of a test of the smoke conditions during various hours of the day, supplemented by photographs of the stack when smoking. The Smoke Inspector does most of this work.

In dealing with a violation of the smoke ordinance, a letter is first sent to the building owner notifying him of the condition, directing his attention to the law, and giving him a reasonable period, usually thirty days, to remedy the difficulty. During this interval the Department stands ready with suggestions for clearing up the nuisance. Another inspection is then made. If the owner is obstinate, he is then requested to appear before the Smoke Commission, which meets every week. There he is told again about the condition and given a chance to explain. If he says that his neighbor's stack smokes, but not his own, he is confronted with the log and photographs of his building. After this appearance the Commission decides upon the best way to bring about obedience to the law; the offender is sent a formal notification by mail, with thirty or occasionally sixty days for compliance. The letter does not specify a particular mode of prevention; but advice is given if requested.

The Commission tries not to be arbitrary, but considers the individual circumstances, insisting that the owner use every possible means under such circumstances to change the condition. In almost all cases the effort has been successful without any resort to the courts.

How Smoke Is Caused and Cured

Smoke cannot be completely abolished, but it can be controlled and minimized. With regard to its causes and remedies, Mr. Williams says:

"Improper combustion is the cause of all our trouble from smoke. When combustion takes place properly, the fire consumes all the coal, some of which would otherwise go up through the stack and become what we know as thick, black smoke.

"Excessive smoke is not only harmful, not only ugly to a city, but also wasteful to the user. Some of the wiser building owners know this and they are the ones who never resent the work of our Commission, for every dollar they spend in correcting their fire-boxes is returned to them in fuel saving before very many months.

"Proper firing will practically eliminate smoke. Most men posing as firemen do not know the first principle of firing a boiler. It is hard, in fact, to hand-fire any boiler and eliminate smoke. That is the reason that hand-firing is going out. The mechanical stoker—automatic stoker—in my judgment is the solution of the smoke evil. This can maintain proper combustion all the time, which no hand fireman does.

"Our worst evil is the traveling fireman, the man who goes from one job to another. He handles maybe half a dozen fires, not one of them properly. He goes to one of his jobs, cleans out the fire, causing a great deal of smoke and in order to go to his next job, forces the fire, causing a great deal more smoke, then leaves it to its own fate. Such a fire smoulders and does not burn with perfect combustion, and this means that they have a smoky fire."

According to Mr. Williams, there are four rules of proper firing which will eliminate smoke:

1. Do not poke and slice fire unless actually necessary. Never stir the bed upside down; this will make clinkers.
2. Never close dampers tight. Gas accumulations may produce explosions.
3. Never let gas passages in boiler, smoke connections or chimney become dirty or clogged. This results in poor draft, smoke in basement and waste of coal.
4. Never shake or try to remove clinkers on low fire.

There are other ways of controlling the smoke evil under various conditions, according to Mr. Williams, including resetting boilers, changing the stacks, installing steam jets, mechanical doors, and other mechanical devices. Some kinds of coal make more smoke than others. The Post Office in Denver is now experimenting with lignite coal, in the hope that smoke will thereby be minimized.

Smoke Prevention a Good Investment

When smoke prevention work was first begun in Denver, there was a great deal of opposition to it, many building owners protesting violently; but the owners have found that it saved them money to comply with the smoke ordinance. A great many have written letters commending the work of the Smoke Depart-

ment and saying, in essence, that they wished they had been forced to correct their smoke evil years before—they would have saved money.

The Smoke Committee of the Denver Chamber of Commerce, investigating this phase of smoke prevention work, sent out a number of letters to different corrected buildings, asking them to give their experiences.

One building owner writes that he is saving $355 a month in fuel and labor since installing corrective equipment. At the same time he reports his ash has been reduced 50 per cent.

The chief engineer of one of the Denver hospitals reports a saving of over 20 per cent in cost of coal.

The chief engineer of an investment company controlling several buildings reports from 8 to 20 per cent saving.

The president of a Denver manufacturing company says that in one year since he installed a stoker in his plant he has been saving from $350 to $600 a month in fuel.

The work of the city of Denver in abating its smoke evil has been carried far and wide, and many cities have written for information and in some cases sent representatives to study the system in Denver.

Making a City Interesting and Foolproof for Visitors

By E. M. Hawes

EVERY city has its "points of interest"—to which citizens take their guests in "showing them around the town." Such spots may properly be shown with pride, for they give a town its character. Aside from these unusual or outstanding points, all towns look much alike, and so, besides giving a town its character, they contribute a much-desired individuality of memory in the minds of visitors. From the standpoint of city building these things and places "worth seeing" have a growing value which has not been capitalized as it might be to the town's betterment, in view of the development of automobile touring.

Travel has become an enormous industry which any town may well entice, if possible, within its gates. The idea is not to attract a small number of people to spend a week or a month. Instead, it is to attract the thousands of people who now pass hurriedly through and to get them to spend a day or even a few hours in the town, visiting the town's most outstanding and interesting features, spending money while they stay, and going away with a definite and pleasant recollection of that particular town in their minds. Perhaps they will even go away with a desire to come back. Probably they will tell some other people about what they saw and will suggest that they too "go to see that town," which has become far more than "just one of those burgs we passed through."

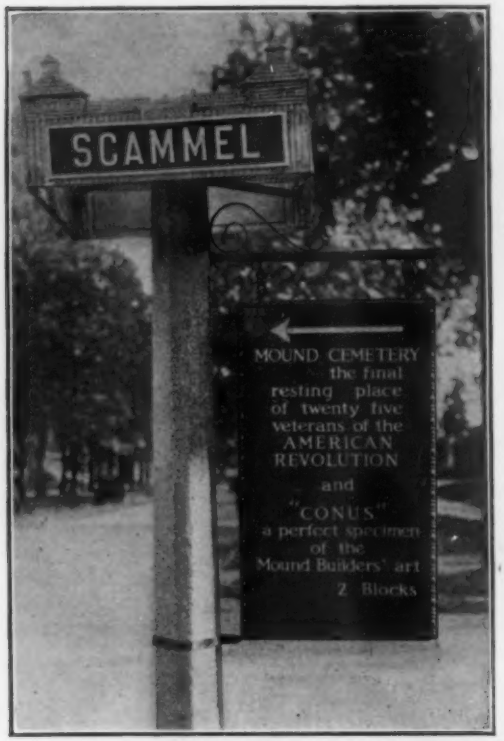
Marietta has struck a new note in town development along this line. Not only has it installed a new system of street nameplates,* but the people of Marietta have determined to make the city inviting to tourists and other visitors.

There are some points of historic interest there—as in most cities. Besides these, there are only the usual run of interesting places in Marietta. The institutional and lodge buildings and the churches, which excite the question "What is that building?" were as a rule unmarked—or at least unmarked in a practical way for the passing motorist. The principal factories were mute as to the wonder, "What does that factory make?" and those factories, with their wire fences and their "No admittance—call at office" signs, were just as repellent to interest as factories often are. Thousands came and went, and only the very few who had personal friends in the city ever had reason to see or to distinctly remember Marietta. The few who ventured to ask what there was to see, got the usual well-intended but unfollowable directions given to motorists—grew discouraged and drove on.

Marietta—like all cities—wanted to grow, and—like most cities—had tried all the hackneyed methods of expansion, with only usual results. Yet here was money—new money going right by the door. In fact, it flowed in a rapidly moving stream through the town, hastening on its way with not even a baffle-plate to cause it to slow down and deposit its particles of gold. So Marietta planned and installed a system of "baffle-plates" said by travelers to be the most complete and inviting marking system they have ever seen. And they are as simple as they are effective.

On the arterial highways and streets have

*See THE AMERICAN CITY, November, 1926, page 679.



ALL THE LEADING HISTORIC SPOTS IN WHICH MARIETTA, OHIO, ABOUNDS ARE EASILY FINDABLE BY ANY STRANGER BECAUSE OF THESE MARKERS

been erected beautiful directional and institutional placques, telling what is to be seen, in which direction, and how far to go. These placques have a remarkable visibility, necessary for passing travel. They are raised metal letters of hand design covered with gold leaf. against a darker background of four-tone antique bronze finish. They are all of standard type, varying in length with the amount of copy, and are recognized by the tourist even before he gets within the city limits as being for him—for his information and convenience. They are lettered on both sides and hang at right angles to the street, so that the motorist looks straight at them instead of getting only a sidewise glance.

Hanging from wrought-iron cross-arms on reenforced concrete posts, they have all the artistry of the old inn signs of early Europe. A wrought-iron "shoe" at the bottom keeps them from swinging, and most of them carry on the cross-arm an ornamental casting, symbolical of the institution they mark. Ornament and all wrought-iron parts are finished in black enamel, baked on to give greater permanence. Those for manufacturing institutions tell more of the concern's human interest story than its own signs do, and bear without exception the cordial line, "Visitors welcome."

The Marietta Kiwanis Club sponsored the entire campaign along with their street markers, and paid for the placques for historical points. Other organizations and individuals bought those for other places in which they had a particular interest. Fifty-six of these unique placques have been installed in Marietta. No one can pass them and not either actually see Marietta's points of interest—or have the best chance in the world to see them.

And this begets an unusual appreciation of the town. Those responsible for the installation estimate that the 1927 "volume of business" from tourists will equal at least that of an industry bringing 342 new families to the community. That industry is worth while to any town.

The system has now been is use almost a year, and actual experience has more than justified the theory that led to the designing of the marker system. Marietta is literally full of tourists. Hotels report the best business ever; more conventions have sought Marietta; gas stations, garages, etc., are busy; and all the resulting dollars find their way into local channels. In fact, so successful has this plan proved that already Zanesville and Springfield, Ohio; St. Mary's, W. Va.; and Ashland, Ky., are installing similar systems, and many other cities have the plan under consideration.

Traffic Officers Should Be in Uniform

"Officers of the law, properly uniformed, merit the respect and esteem of the motoring public. But highway patrolmen dressed in plain clothes who spy on motorists and make arrests for technical violations of law arouse suspicion and distrust. Their practices are obnoxious and will defeat their ultimate aim—law observance. The legislative and ordinance-making bodies of the various states and communities should sponsor and give legal sanction to the principle that all traffic and highway officers shall be in uniform while on duty."

—A resolution adopted at the 1927 convention of the American Automobile Association.

Low-Cost Protection for Public Employees Against Death, Illness and Accident

By John A. Piquet

GROUP insurance protection against death, illness and accidents is operating satisfactorily in a number of American municipalities, and merits as much consideration from public bodies as it has had from private employers, who in the last ten years have brought its advantages to over 4,000,000 employees in every line of business. Old-age pensions have been a recognized responsibility of governing bodies toward public employees for many years. It is only in the last few years, however, that group protection against death, illness and accident has come to the front.

The Metropolitan Life Insurance Company, which has had extensive experience in the group insurance field, is carrying the group insurance of the following public bodies:

Asheville, N. C.
City employees
Kingsport, Tenn.
City employees
Memphis, Tenn.
Fire Department
Board of Education
Shelby County Commissioners
Mobile, Ala.
City employees
Montgomery, Ala.
City employees
Pensacola, Fla.
City employees
Vicksburg, Miss.
City employees.

Group Insurance for Municipal Employees

The humanitarian and economic advantages of group insurance in private employment, are proving to be so great that a much more general extension of the idea to public employment is believed to be desirable. Experience has shown that group insurance increases loyalty and efficiency and reduces labor turnover.

In addition to telling what group insurance is, how it works, and what it costs, and discussing its applicability to municipal employment, the author points out the legal obstacles which now exist in many states to the expenditure of municipal funds for this purpose. Where cities have not the clear right to spend public funds for group insurance, a concerted effort to secure such right by general laws would seem to be a worth-while undertaking for the leagues of municipalities.

What Group Insurance Is

Group life insurance is straight protection against death, without cash or loan values. It also carries a total and permanent disability provision for such cases occurring before the age of 60, when the insurance is paid to the disabled employee in monthly installments.

Group life insurance is available for fifty or more employees of a common employer. Wholesale life insurance is for groups of employees numbering between 10 and 49. Only regular full-time employees are eligible to apply for either form. When the premium is paid entirely by the employer (municipality), the insurance must cover all eligible employees. The employees may share in the payment of the premium (generally about 50 per cent), in which event at least 75 per cent of the employees must make application for the insurance.

Volunteer fire departments, being composed of members not spending the major portion of their time for the department, are not eligible for group or wholesale insurance, but may apply for regular individual policies.

Employees actively at work may apply for group insurance without medical examination and without limit as to age. For wholesale insurance, there is no medical examination in the large majority of cases, and a modified examination for higher amounts of insurance or a smaller participation by employees.

If the employee leaves the public service, his life insurance ceases, but he may convert without medical examination to an equivalent amount of individual insurance at rates applicable to his attained age, term insurance excepted, and provided he converts within 31 days' time.

Health and Accident Insurance

Group protection against illness and accident is available to 25 or more employees of a common employer, with the same general rules applying as in group life insurance. These weekly benefits must not exceed two-thirds of the employee's salary, and are for illnesses from any cause, and for accidents off the job. Benefits covering accidents on the job may be offered when state or workmen's compensation is not available.

The benefits generally run for a maximum of 13 or 26 weeks, and begin usually on the eighth

day of illness. The cost depends on the plan selected and on the nature of employment and the general character of the group.

Another form of group protection is accidental death and dismemberment insurance; it pays the face value of the policy for accidental death or for injuries on or off the job resulting in loss of both eyes, hands or feet, and half the amount for loss of any one of these.

Cost of a Municipal Group Insurance Plan

The following program is suggested as adaptable to municipalities:

Laborers and unskilled employees could receive $1,000 life insurance, and $10 weekly illness and accident benefits for 13 weeks for each sickness.

General employees could receive $2,000 life insurance and $15 weekly benefits, and supervisory and other officials higher amounts.

Officials and salaried employees whose pay continues during illness should not be offered sick benefits.

Generally speaking, group or wholesale life insurance costs about $10 or $15 per year per $1,000 of insurance, or about 90 cents to $1.25 monthly. The exact rate, of course, depends upon the ages of the employee insured and also the nature of the occupations. It must be remembered that the age characteristic of a municipal group is generally higher than that of the average clerical or industrial establishment, because of the lower labor turnover. Due regard must be also given to the percentage of employees who are firemen or policemen, whose occupations are of course hazardous.

It will be noticed, therefore, that the rate charged on a group of school teachers would be considerably less than that charged for a group of policemen and firemen. In the consideration of group insurance by a municipality, however, before it is proposed to insure any one class of employees, due provision should be made that no other class of employees will be discriminated against by not including them in the general insurance plan.

Several of the companies are mutual insurance companies; that is, their policies are participating, and if the claim experience is satisfactory, dividends may be declared if and as earned, thereby reducing the net cost of the group insurance.

Nursing and Health Service

Any employee insured under a Metropolitan group program who becomes ill or injured and lives in any one of 4,000 cities and towns in the United States and Canada where the company maintains a visiting nurse service, receives bedside nursing care without charge if he wishes it.

Insured employees also receive from the Metropolitan illustrated booklets on health and home subjects, covering such topics as "Overweight," "Care of the Baby," "Tuberculosis," etc. Some 100 booklets have been prepared, covering many important subjects.

Group Pension Plans and Insured Thrift

Group annuities for old age, beginning at the age of 65, have been worked out for many private employers. There is no reason why such plans on a guaranteed basis should not serve public employees equally well. The city may pay the entire premium, or share the cost with the employees.

The Insured Thrift plan enables employees desiring to save systematically toward a certain goal, say $1,000 within 10 years' time or by the age of 65, to do so surely and painlessly through payroll deductions, and with the assurance that should they die or become disabled before the $1,000 is saved, the full amount will nevertheless be paid them or their beneficiary. This is made possible by a covering amount of group life insurance equal to the amount they are saving for. Employees may withdraw from the plan at any time, receiving never less than their contributions.

Legality of Municipal Expenditures

Has the municipality a legal right, in the absence of special charter provision or general state legislation on the particular subject, to expend public funds for payment of premiums on group life insurance on the lives of its employees, and for their benefit? The question, of course, is whether such expenditure is for a proper and authorized public purpose, having in mind the general principle that the powers of a municipality are only those specifically granted by the legislature and those necessarily incident to such specified powers.

This question was brought to general attention by a case in the state of New York where the group insurer of a municipality was unable to recover premiums due on such a policy. There have also been opinions rendered by the law officers of certain states and municipalities indicating doubt of the authority of municipalities to make such expenditure of funds.

On the other hand, the courts of New Mexico and Tennessee have upheld the right of municipalities to purchase group insurance for their employees, and in New Jersey and North Carolina there are specific statutes authorizing such expenditures. In some states special charter provisions or general municipal statutes may be broad enough to permit such expenditures,

The Reconstruction of Tokyo

By Shinzo Hirano

Assistant Secretary, Tokyo Institute of Municipal Research

THE reconstruction of Tokyo was an extremely difficult task when one-half of the city was in ruins, and that the half comprising the most important commercial and industrial districts. Some people who have questioned me in America have seemed to fear that Tokyo might encounter the same troubles as London after the great fire of 1666, and San Francisco after the terrible earthquake of 1906; that is to say, Tokyo might make splendid plans that would fail owing to conflicts between public and individual interests.

But almost four years have elapsed since the great earthquake, and Tokyo has already arisen from her ashes. The reconstruction work of the city is being carried out step by step. Now let me explain a little about the reconstruction work. From the view of administration, the whole reconstruction program has been a cooperative work of state, prefecture, and city, while fundamental policies are directed by the reconstruction bureau.

What Tokyo did was to put into effect a scheme of replanning such as no city in the world has ever seen before. To begin with, it provides for the laying-out of new streets, the widening of those that already exist, the building of bridges, the digging of more canals, the readjustment of blocks and lots. It also provides for the adjustment of water-works, sewer systems, drainage, gas plants, tramways, the organization of central municipal markets, and the enlargement of the park system.

The new network of streets makes the backbone of the whole plan, and the budget of the network costs nearly one-half of the whole expenditure. This comprises three different kinds of streets: trunk lines, auxiliary streets, and land adjustment streets. There are 52 trunk lines, 75 to 140 feet wide; and a complete system of auxiliary streets from 38 to 74 feet wide. These two systems taken together offer improved opportunity for future traffic development, projected street-car extension and general planning for Greater Tokyo. The land adjustment streets are less than 38 feet wide, and have been laid out in connection with the replanning and subdivision of land. Their object is to increase the utility of every inch of land. The total length of streets over 38 feet wide is 888,354 feet. About one million *tsubo*, or 817 acres, of land will be used for streets, new parks and canal ways. If such a large area of land were taken by ordinary process of condemnation, about 300,000 inhabitants must lose their places of living or business in the city. In order to avoid this difficulty, each lot is reduced in size from ten to fifteen per cent and thus the 817 acres becomes available, one-half of it without cost to the city.

The Editor Bows to the Author

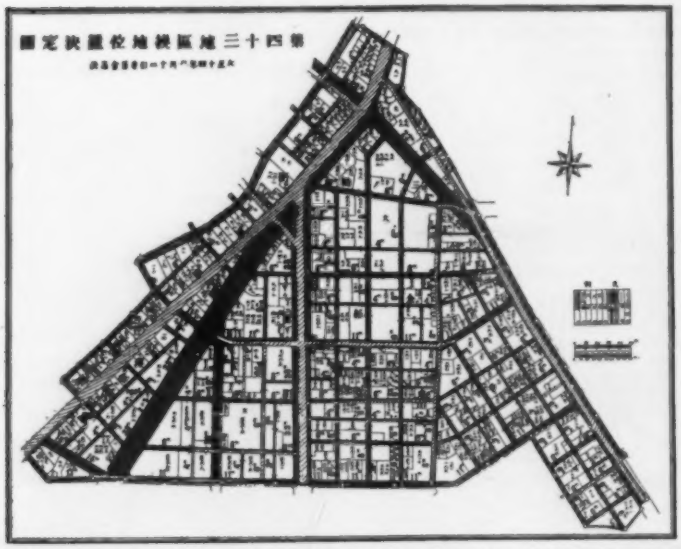
Dr. Hirano, during his brief stay in New York and Boston on a recent American trip, wrote the accompanying account of Tokyo's replanning program for The American City's readers. To this task he brought a surprising knowledge of city planning problems and progress in America and Europe as well as in Japan; and a facility in the use of English which enabled him to record with precision and accuracy, if not always exactly in the accepted phraseology of the Western World, the things he had to say. At his request, his manuscript has been edited somewhat as to diction in a few places, but we cannot resist quoting his captivating introduction:

"The problem whether the city of Tokyo can be on her foot and rehabilitate with new plan is watched with a great interest by not only the scholars of municipal governments and city planners but most of the people of all over the world. It was the first question, if Tokyo could be reconstructed and how it has been progressing, asked by the people I met in different cities in this country where I visited."

In carrying out this plan smoothly, the governmental authorities prohibited any permanent building on the old lots until the new network was settled. On the other hand, it limited the term of temporary building to six years. The area where the land adjustment policy is administered covers almost the whole devastated areas, which, for convenience in carrying out the plan, are divided into 66 districts. Each district has a commission consisting of twenty committees elected from the landowners and leaseholders therein. These committees act in an advisory capacity only, but their advices are always accepted.

To operate the land adjustment, the authorities consult with each other about the position of new lots, and then as to their areas. When these matters are settled, an order is issued for the removal of owners or tenants. After removal work is completed, the matter of com-

THIS IS A MAP OF A SECTION OF TOKYO AS IT APPEARED BEFORE THE EARTHQUAKE



AND THIS IS A MAP OF THE SAME SECTION, SHOWING THE LAND ADJUSTMENT PLAN NOW BEING CARRIED OUT

There are sixty-six districts in the complete plan, of which the forty-third is here shown

pensation is cleared up. In order to deal fairly in compensation adjustment, the authorities have organized a compensation commission. This commission passes upon land values, expenses and damages incident to the removal of buildings and the stopping of business, etc., which have been appraised by the executive department of the bureau of reconstruction.

To last spring, about eighty-five per cent of the position and area of new lots had been decided, and orders of removal issued for thirty per cent of the new building, about twenty per cent of the buildings having already been removed to new lots. We expect to complete this readjustment work in 1929. This undertaking is, as I have said already, the foundation of the whole reconstruction program, and unless it is successfully accomplished, not a single line of street can be laid out, widened, or paved. As soon as temporary buildings have all been removed to the new lots, we begin work on streets, parks and canals. The plan provides for thirteen canal lines, new or reconstructed; three large parks and fifty-two small parks, or playgrounds. The three large parks will occupy 68,000 *tsubo*, or about 55 acres; and smaller parks and playgrounds, 47,000 *tsubo*, or 33 acres.

Two Difficult Problems of Land Adjustment

Now, there are two difficult problems in the execution of this plan. In the first place, how can the people raise enough money to reconstruct their buildings since they lost all that they had by fire. The damages were so great that insurance companies were not able to pay the whole amounts on buildings and properties. Losses resulting from the suspension of business after the earthquake and until order was restored, also represent a tremendous sum. Moreover, those located within certain districts, or zones, must build fireproof constructions. It is, indeed, no easy task for them. Recognizing this, the Government grants a bonus of $25 per *tsubo* (or every 6 square feet) on buildings erected in the compulsory fireproof districts. Furthermore, the Mayor of Tokyo, in cooperation with the Department of Finance, has established a reconstruction building company modeled upon studies made principally by the Tokyo Institute of Municipal Research. The object of this company is to build and sell standardized fireproof buildings in allotments, or to lend money to those who are willing to erect standardized fireproof buildings. This company has a capitalization of $5,000,000 and loans from the Government amount to an additional $30,000,000, making a total of $35,000,000. This is, of course, insufficient to solve the building problem. We

need more media for monetary circulation.

The second problem arose in consequence of the land adjustment having materially decreased the size of every lot. Some lots have become too small for adequate buildings in keeping with the character of their location and the width of the streets upon which they face. In some extreme cases the lots are only 4 or 5 feet wide, and 10 or 15 feet deep, with frontage on a street 150 feet wide. Moreover, these are scattered among lots much larger. Such lots are suitable only for steep tower-like buildings. Such land cannot be utilized intelligently for independent building nor can the city afford such building from the standpoint of economy, safety, health, or beauty. One remedy for the trouble, we think, is the division of blocks into adequate units amalgamating large and small units, and the erection of cooperative buildings.

Under such a plan, some businesses will of necessity be located on the first floor, while others, such as barber shops, tailor shops, and offices of various sorts, can just as well occupy space on floors above the street level. Those who occupy space on higher floors can afford larger rooms than those on the ground floor, since the cost will be smaller. Such an amalgamation of large and small lots with the necessary cooperation among individual owners, offers great difficulties, so great that a law may be passed compelling cooperation where it cannot be accomplished otherwise.

The reconstruction budget comprises the following figures:

The total amount to be spent during six years, or before the end of the fiscal year of 1928, is $315,000,000. The National Government is providing about $150,000,000 of this amount; a sum of $6,000,000 is provided by the Tokyo prefectural government; and the balance comes from the Tokyo municipal government. One-third of the revenue for the whole budget is raised by domestic bonds, and the remainder will be realized from international loans.

The major expenditure of this budget is for street work which involves about half of the entire amount. Land adjustment will require about a fourth.

In closing my brief review of reconstruction undertakings and achievements in Tokyo, I must express our gratitude for the hearty sympathy and encouragement given by American and other foreign friends to Tokyo in the time of our great disaster, and in our reconstruction work. The people of Tokyo are especially indebted to Dr. Charles A. Beard. No sooner had the awful news of the great earthquake shocked all over the world than Dr. Beard telegraphed from New York to Viscount Goto, his friend, then Minister of Home Affairs, saying: "Lay out new streets; forbid building within street lines; unify railroad stations." Soon afterwards, he was invited to Tokyo to assist in the study of reconstruction problems, and came for a short time.* His ideas greatly influenced Minister Goto in forming his plan for the New Tokyo which is now being realized.

* Dr. Beard was in Japan in 1922 as an advisor of Viscount Goto, then Mayor of Tokyo, in the inauguration of the Tokyo Institute for Municipal Research. At that time he made an intensive study of the administration of the city.

Street Trees Should Be Hardy and Smoke-Resistant

IN a recent issue of the *Daily Science News Bulletin*, Dr. Haven Metcalf, Senior Pathologist in Charge of the Bureau of Plant Industry of the United States Department of Agriculture, explains why street trees have such a hard life in the modern industrial city:

"When one considers what the average street tree is up against, it is really a wonder that we have any of them left. As a matter of fact, all that we have left are the tough ones, and there is much to indicate that in the modern paved city most of these will be short-lived. When growing under natural conditions, a tree has unpolluted air, soil that is not only unpaved and untrodden, but deep, soft, and annually enriched by the deposit of dead leaves. You know how black and rich the top soil is in the forest. A street tree, on the other hand, has its leaves choked by smoke. If you doubt this, take a leaf from some street tree some day when there has been no recent rain and rub it on your cuff.

"But it is not only the soot in smoke that does harm, but the invisible gases and fumes. A recent contribution to these fumes is the exhaust from automobiles. Then the street tree is lucky if it has nine square feet of soil around it that is not paved. The pavement prevents aeration of the soil, keeps away water, and above all prevents any of the natural food supplied by the decaying leaves from returning to the soil. To a less extent, yard and park trees suffer from the same difficulties. They breathe the same smoke-laden air, and, while park and yard are not paved, the grass is cut away and the leaves raked up and removed, and the soil will usually be found to be hard, dry and lacking the necessary foods for vigorous tree growth.

"Street, yard and park trees suffer from many specific diseases and also from injuries, but these are unimportant compared with the malnutrition which results from lack of the natural food supplied under forest conditions by the falling leaves. In the case of park and yard trees, this difficulty can be met to some extent by fertilizing the ground, but the conditions under which street trees live are so severe that the best way to meet the problem is to plant only trees that are hardy and smoke-resistant. The sycamore is a typical example of this type and will probably be planted increasingly as time goes on."

What Aerial Mapping Has Done for Syracuse

An Indispensable Adjunct to Many Departments of the Municipality

By Nelson F. Pitts, Jr.
City Engineer, Syracuse, N. Y.

WHEN the city of Syracuse entered into a contract in 1926 for airmaps of the city and the territories considered for immediate and future annexations, the municipal officials did not fully comprehend the great benefits such mapping would bring. It was something comparatively new; something that might or might not be worth the expense. Now they know the worth of the plan.

In the period since the seventeen sectional maps and the combined mosaic were delivered by the Airmap Corporation of America, the benefits accruing therefrom have justified, many times over, the cost of the completed contract. The maps have been and are of inestimable value to the various branches of the municipal government, in ways little considered in some instances when the mapping was ordered.

To the Bureau of Engineering, in practically all of its eleven divisions, the sectional and mosaic maps are of especial importance. They provide a clear and comprehensive view of the entire city, obviously unobtainable by any other method of mapping. They show accurately the data upon which are based many of the various municipal improvements and the general progress program under the jurisdiction of the Bureau. The maps present at once not only a composite view of the entire municipality and environs, but an unobstructed vista, through

AIR VIEW OF ERIE THOROUGHFARE IMPROVEMENT WEST OF WARREN STREET, SYRACUSE

the sectional maps, drawn on a scale of 600 feet to an inch. The value of such visible information is obvious.

Sewers, Water-Supply and Street Improvements

For instance, when sewers are to be installed in a newly developed territory, a glance at the sectional map of the district in question shows at once and accurately where there is the most new building and points to the streets first in need of the improvement. Of course this could be done through personal inspection by the Bureau's engineers, but the time and the labor saved because of the use of these maps are great factors in hastening construction. This applies also to the development of paving, water and like systems.

In planning for sites for the new water-supply reservoirs, the maps have given a service that could not have been obtained in any other way. With the entire terrain pictured, it is far easier to consider possible locations.

In the city's program of street widening, paving and general improvement for the year—which has been exceptionally extensive—the maps have been and are invaluable. They provide an accurate and concise foundation for the necessary engineering study, thereby eliminating a part of the ground survey work previously required. And when a bureau of engineering is working under high pressure, time is a great factor. These maps save time and therefore trouble and extra labor.

Particularly effective have been the maps in consideration of construction of storm-water sewers to lessen the hazards of floods in the lower-lying sections, which have been extremely serious at times. Both the Intercepting Sewer Board, created by act of the New York State Legislature to handle the problem, and the Bureau of Engineering, have found the worth of the maps in making their plans for construction. The clear picturization of the zones affected has afforded a comprehensive foundation for the work that has been and is being done.

Park Extensions and City Planning

To the Planning, Parks and Recreation Commission these maps are likewise invaluable, showing at a glance what zoning changes and planning improvements will insure the greatest benefits in the development of the city, not only in beautification, but in mercantile, in-

AIR VIEW OF ERIE THOROUGHFARE IMPROVEMENT EAST OF CLINTON STREET, SYRACUSE

dustrial and residential betterment. For park extension programs and for additional park projects, the maps are of incalculable worth.

In planning for annexations and the consequent and necessary improvements therein, each department, bureau and branch of the municipal government, directly or indirectly connected with such expansion of territory, has found the sectional maps valuable—to an extent perhaps not yet fully realized. Without them, new water, sewer, paving and other concomitant systems could not have been and could never be so well defined and wisely planned.

Assessing Property for Taxation

The Board of Assessors finds these pictorial surveys of great assistance in various ways. For instance, property which may have been inadvertently passed by in figuring assessments is located on the sectional maps and properly assessed. The resulting income reduces the original cost of the mapping in no small degree.

Various other branches of the municipal government have profited largely from the maps in instances too numerous to mention. The veriest layman can easily visualize how great the value, how important the use, of aerial maps as a constructive factor in municipal development.

From Mules to Motors

When the state of New York declared, in December, 1917, and in January, 1918, the abandonment of the Erie and Oswego Canals, both running through the very heart of the business sections of the city, a problem arose: What was to be done with the canals and with the abutting lands?

The story of the passing of Clinton's "Big Ditch," or Clinton's "Folly," as the Erie Canal was derisively called by skeptics of the plan of wedding the waters of the Hudson River at Albany with those of Lake Erie at Buffalo, is a romance of progress for another story. "From Mules to Motors" it might be called. There is no space for it here.

Syracuse acquired about 5 miles of the Erie Canal lands and about 2½ miles of the Oswego lands and prepared to build, on the filled-in waterways, broad thoroughfares from the eastern to the western city line, over the Erie, and from the center of the city to the northern city line, over the Oswego. The work was started and has been carried on as rapidly as is consistent with the best of workmanship, material and results. Where once sluggish, reluctant mules and weary horses slowly drew heavy, awkward canal-boats and the "packets" of olden days, now is heard, day and night, the steady hum, throb and snort of modern motor vehicles. It is a remarkable transformation.

How much better the work has been done, with how much more engineering accuracy and with how much more speed because of the use of the airmaps cannot now be fully estimated. The work is not finished, but it is progressing rapidly, the more so because of the maps. The filling-in of the canal prism is now 95 per cent complete, and a permanent, smooth, level pavement is being built, 56 feet wide, through the very heart of the city. On the Oswego Canal lands virtually the same conditions exist, save that one portion has been set aside and on it has been erected a modern and commodious public market.

The Bureau of Engineering lays much stress upon the importance of airmaps in the steady and progressive development of these broad thoroughfares built over the beds of the abandoned canals. When one can see the entire terrain, unobstructed by buildings, curves and other tangible, material construction, one can more easily and practically plan for the best solution of the problems involved. The airmaps have provided this composite, comprehensive, clear view.

Airmaps, Syracuse finds, are necessary. They fully justify the cost. The experience of the various bureaus and boards of the Syracuse government, since the aerial survey was completed and the large maps made easily accessible, are concrete evidence of the practical value of mapping municipalities from the air.

Osaka, Japan, Plans to Spend $90,500,000 on Rapid Transit

CONSTRUCTION of a rapid-transit system in Osaka has been approved by the Ministry of Railways of Japan, according to announcement just made by the U. S. Department of Commerce. The information was conveyed by the Assistant American Commercial Attache at Tokyo, J. V. Ehlers.

The full text of the announcement, as published in the United States Daily of July 11, 1927, follows:

"The plan is said to involve an ultimate expenditure of 162,000,000 yen (approximately $90,500,000).

"The projected line is 33.65 miles long, of which 13.07 miles will be underground and 20.58 miles elevated. It will be of wide gage and operate on the third rail system at an average speed of 25 miles per hour, with a maximum speed of 40 miles per hour. The work will start in 1929 and will be finished in 1936.

"Bonds will be sold to provide the necessary funds, but it has not been decided whether these will be floated in Japan or abroad. The project consists of four distinct lines."

Carbon Monoxide Menaces Life and Health

By Thomas D. Wood, M. D., and Ethel M. Hendriksen

ON a chilly night in early spring, a young couple, engaged to be married, were driving on a deserted highway in their enclosed automobile. They stopped the car, allowing the engine to idle. When found some hours later both were dead—their hands clasped. There were no signs of foul play nor of intentional suicide. Ignorance of the danger of enclosing themselves in an automobile with the motor running was the cause of these untimely deaths. Carbon monoxide, a deadly poisonous gas, is always present, in varying degree, wherever automobiles are running. An idling motor produces more carbon monoxide than one running under a load. The best precaution against this deadly gas is plenty of fresh air in properly ventilated automobiles and garages. Motors should never be allowed to idle uselessly.

The running of automobile engines in closed garages is the most frequent cause of fatal accidents from carbon monoxide poisoning. Garage employes are subject to this danger, but usually are aware of the risk they take and in consequence protect themselves better than the owners of the private garages.

While deaths from carbon monoxide among men are more common, due to the careless handling of automobiles and to industrial accident, women meet as definite dangers from carbon monoxide in the home.

Turning down the flame under her gas-range oven, a housewife left the kitchen. When she returned she was overcome by the fumes of carbon monoxide, caused by the incomplete oxidation of the gas. When gas stoves are used, flues should be provided for them, and in addition, some windows should always be kept open, preferably at the top. Gas expands in a warm room and rises. It is dismissed more quickly at a high outlet.

Kitchens, as well as other rooms, are more scientifically ventilated if a small outlet is provided in the highest part of the wall opposite the windows and leading up through the walls to the roof. Such outlets should have dampers in order to close them when the room is not heated. With windows opened slightly at the tops and with an outlet near the ceiling in every room, satisfactory ventilation is insured.

Bathroom gas heaters are often a danger unless the bathroom is well ventilated. Ceiling outlets for overheated and odor-laden air are particularly desirable for bathrooms. It is wisest to turn off the gas heater before getting into the bath.

Defective furnaces are sources of danger from carbon-monoxide poisoning. All furnaces and gas appliances should be inspected regularly by an expert to determine the safety of their condition.

The use of gas in cold weather is sometimes dangerous because gas freezes at a certain low temperature. Two men went to bed and to sleep on a cold night with a gas heater burning. The gas froze during the night and extinguished the flame. Later it thawed and allowed the gas to flow again, asphyxiating the two sleepers. Never go to sleep in a room where gas is burning, is an invariable rule to follow.

A Rapidly Increasing Menace Demanding Attention by Public Health Departments

Not the least important function of health agencies is to educate the public as to dangers to individual health not controllable by law. Important among these is the widespread and rapidly growing menace of carbon-monoxide poisoning from automobiles, gas heaters and other causes.

The authors of the accompanying article are, respectively, Professor of Health Education, Teachers' College, Columbia University, and Former Executive Secretary, Tuberculosis and Public Health Association of Rochester and Monroe County, New York.

Ozone has been advocated to dissipate the fumes of carbon-monoxide and thus render them harmless. Scientists are of the opinion that this belief is a fallacy and that the chief reliance should be placed on adequate ventilation. This article describes the ventilation necessary to guard against carbon-monoxide poisoning.

A valuable book by Dr. Wood and Mrs. Hendriksen, "Ventilation and Health—The New Hygiene of Fresh Air" was reviewed in The American City for June, 1927, page 857.

Carbon monoxide is the more treacherous because it is odorless, tasteless and invisible. It sometimes occurs, however, in company with other gases which do have odors. Any odor of gas should be a signal of danger.

Unfortunately, the sense of smell serves one only upon first entering a room from the outdoor air. After we become accustomed to the air of a room we no longer notice odors. Occasionally someone will come into a room from outdoors and exclaim, "What an odor of gas you have in this room! Where does it come from?"

"Why, we haven't noticed it," will be the invariable reply of those in the room. The deadly poisonous gas gets in its work before its victims are aware of its presence.

Startling Increase in Fatalities from Carbon-Monoxide Poisoning

The increase in the number of fatalities due to carbon-monoxide poisoning is startling. A total of 788 persons in New York City sacrificed their lives last year, needlessly, through their own carelessness or that of others. This is an increase of 40 per cent in two years. This increase is said to be general throughout the country and is due to the more extended use of coal and petroleum products, particularly of gasoline for automobiles.

Many cases of mild poisoning occur from carbon monoxide. The "carbon-monoxide headache" is a common complaint among garage employees. Some persons suffer from "carbon-monoxide headache" upon return from a long automobile ride in a closed car. Those who sit in rooms heated by gas invariably complain of headache.

A young woman who suffered from periodic headaches so severe that she had frequently to be absent from her work, was given a number of tests of various kinds. Her eyes were examined and she was asked to abstain from various kinds of food. Finally, just as she was about to enter a hospital to receive a complete metabolic test, it was discovered that all winter she had been occupying an office heated by gas. The windows were of such a type that they could not be opened without a draft.

It took this young woman several months to recover completely from these headaches, even after she moved to another office. Some studies are now being made of the possible extent of damage to the nervous system of long exposure to the fumes of carbon monoxide.

The variety of dangers from this deadly poison seems to have no end. Poisoning sometimes occurs in a mild form from the most unexpected sources.

Some tests made of carbon-monoxide poisoning among smokers show that inhalers are taking a risk. Mild cases of poisoning were found among them, pipe smokers showing a higher percentage of carbon monoxide in the blood than users of smoking tobacco in other forms.

Shorter Shifts Recommended for Traffic Officers

Traffic policemen recently have been found to suffer from mild carbon-monoxide poisoning where they are exposed for several hours at a time to congested automobile traffic. Shorter shifts for traffic officers are recommended, and the possible transference of officers from time to time to less busy sections.

Pedestrians on a crowded thoroughfare are not without risk from carbon-monoxide poisoning. In waiting for traffic to pass it would be wise for pedestrians to stand back from the curb. Our cities may face the necessity for a complete division of motor and pedestrian traffic for the sake of health as well as safety.

Automobile exhaust should be reduced to a minimum by stopping the motor when the car is standing for more than two or three minutes. One sometimes sees little children playing around a driveway where delivery trucks enter and stand with motors idling. Children, as well as adults, should keep away from automobile exhausts. But children are particularly susceptible to carbon-monoxide poisoning. They are more quickly overcome.

Carbon monoxide in the human body possesses a greater power than oxygen for combining with the hemoglobin of the blood. Oxygen, therefore, is driven out of the blood and carbon monoxide takes its place. When 30 per cent of the hemoglobin is rendered incapable of its life-giving function, then the symptoms of poisoning appear.

The first symptoms of poisoning are a feeling of tightness across the forehead, blood rushing to the surface of the body, and a throbbing headache. As the poisoning continues, a sensation of extreme fatigue is experienced, accompanied by weakness and dizziness. Nausea and vomiting may take place. There is a loss of muscular control, accompanied by increased pulse and respiration rates until finally collapse and coma occur.

Curiously enough, these symptoms may not become manifest while the person is sitting quietly at work, but may appear upon exercise. Muscular activity increases and accentuates the symptoms. In the treatment of the condition, the first rule is to prevent exercise. Carry the patient into the open air, keeping

the extremities warm by use of blankets and hot water bottles.

Value of Inhalation Apparatus and Oxygen-Carbon Dioxide Tanks

The inhalation of oxygen-carbon dioxide is the most satisfactory method of dealing with victims of carbon-monoxide poisoning. The inhalation technic is recommended for use in mild cases of gassing as a method of relieving the symptoms of headache, nausea and the like, quite as much as for use in resuscitation. Inhalation apparatus and oxygen-carbon dioxide tanks should be a part of the equipment of every health center as well as of hospitals, garages and large industrial plants. It should be sent for at once and a physician or nurse should be summoned to administer the treatment.

During the period of recovery the patient should be kept in a cool, well-ventilated room. Care should be taken not to use gas appliances which will produce any of the fumes from which his sickness occurred. Hospital care is usually advisable.

Proper Ventilation an Important Safeguard

Ventilation is the principal means of preventing carbon-monoxide poisoning. In industries liable to carbon-monoxide fumes in the process of manufacture, in mines and in vehicular tunnels special ventilation equipment is necessary; but for the average domestic purpose with which this article deals, window ventilation is sufficient but must be properly managed. Manufactured ozone should not be depended upon to dissipate carbon-monoxide fumes.

Increased attention to proper ventilation of all rooms used for domestic, educational, industrial or commercial purposes will provide the means of greatly reducing the mortality from carbon-monoxide poisoning and at the same time will improve the health of the occupants of these places. Overheating even in a slight degree impairs the tissues of the body, making it susceptible to poisons of whatever kind. We cannot live indoors safely in air that is warmer than 68 degrees F. For the best health we need a constant supply of fresh, gently moving outdoor air.

Ventilation is one of the newer applied sciences and its contribution to the prevention of such a condition as carbon-monoxide poisoning is simply one vital example of what it has to offer to the welfare of mankind.

Creating the Silent Street-Car

IN two widely separated communities, outstanding attempts are being made by the traction companies to effect a large reduction in the amount of noise made by street cars. The more recent experiment has taken place in Springfield, Mass., where a car combining several more or less novel features was recently put on the rails. The driving motors, instead of being directly on the axles, are mounted in the truck frames, thus providing them with spring support and correspondingly reducing the amount of pounding over crossings, switches and other special track, low joints and rough track generally. Power is transmitted from motor to axle by worm-drive, which is the chief novelty in street-car design represented by the new car. The axle contains a differential, to which feature is attributed a remarkable smoothness and quietness around curves. Tapered roller bearings are used between wheel and axle. Brakes of the internal expanding type, such as have been developed for busses, are used, and have proved to be very effective both for quietness and quick stopping. The *Electric Railway Journal* of April 16 says: "Noise of operation was limited to the hum produced by the wheel flanges in grooved rail, the trolley wheel and motor armatures. Gear noise was absent and brakes were entirely silent. It is expected that even greater quietness will be obtained by the use of rubber pads on the wheel webs." The light weight of the motors and the extensive use of duralumin in the body are the main features that have kept the weight down to 23,450 pounds.

For several years the Twin City Rapid Transit Company, controlling street-railway operations in Minneapolis and St. Paul, Minn., has been trying out a light-weight "noiseless" car which has greatly reduced noise as compared with the older types on that system. Light-weight motors, roller bearings and automobile-type brakes have been utilized, but the usual direct drive has been employed. Duralumin enters into the construction to a considerable extent; and although the car will seat 50 passengers, its total weight is only about 25,000 pounds, whereas the olders cars weigh from 40,000 to 50,000 pounds. Six experimental cars, weighing still less by 1,000 pounds each have been in use on the system and have given such satisfaction that twenty-five more of the type described above are to be constructed for its use, and three other cities—Nashville and Chattanooga, Tenn., and Evansville, Ind. —have ordered a total of thirty-three.

Besides the two experiments on the part of street-railway companies noted above, the municipal tramways of Bradford, England, are also trying out a car designed for quiet operation, and constituting quite a departure from the regulation double-deckers. The new car, as described in the *Electric Railway Journal* for May 7, is single-deck with center doors and is equipped for relatively high speed. There are two motors, of lighter weight than in usual British practice; each is spring-suspended from the underframe of the car and drives the farther axle of one truck through a flexible propeller shaft and worm gear. A marked reduction in noise is reported.

Real Estate Subdivisions and Drainage

By L. K. Sherman

President, Randolph-Perkins Company, Chicago; Past President, U. S. Housing Corporation

THIS article might be entitled "The Crime of Selling Under-Water Lots." In numerous real estate subdivisions there are lots so platted that they cross the path of natural watercourses. During the summer months and sometimes over a period of two or three years there is little or no water passing over the land. Everything looks lovely. The prospective lot buyer who may be a trifle skeptical is assured that "when sewers are built it will take care of all that." Yes, sometimes it will, and sometimes it won't. We have seen many cases where the water came in through the basement windows on one side of the house and flowed majestically out of the opposite side.

The real estate man under the law owns title to the low land and even the bed of the watercourse. He does not want to throw any of the land away, good or bad, even though it is legally subject to the easement of the natural flow of the storm water and even though nature floods the lots without reference to any law save that propounded by the late Sir Isaac Newton.

Now the point I wish to make is this: It is not necessary for the real estate man to throw any of his subdivision land away or even to confine his lot-selling to the month of August when the land is dry. With a proper location of lots, streets and parkways, none of the future property need be subject to damage, and a small watercourse may be an asset instead of a liability. In any event, proper subdividing with reference to drainage will prevent a lot of grief for posterity.

Two Simple Fundamental Principles

I would set forth two simple fundamental principles to be followed in the case of proposed land subdivisions occupied by permanent or intermittent streams or watercourses:

First, when the maximum possible storm-water flowage is such that it may be conveyed through a sewer not exceeding three to five feet in diameter, then locate a street on the line of the watercourse or a street on a line to which the watercourse may be readily moved.

Second, when the maximum possible storm-water flow of the stream is in excess of the capacity of a sewer, as aforesaid, then locate an alley or the rear line of abutting lots along the center line of the stream or a center line to which the stream may be readily moved.

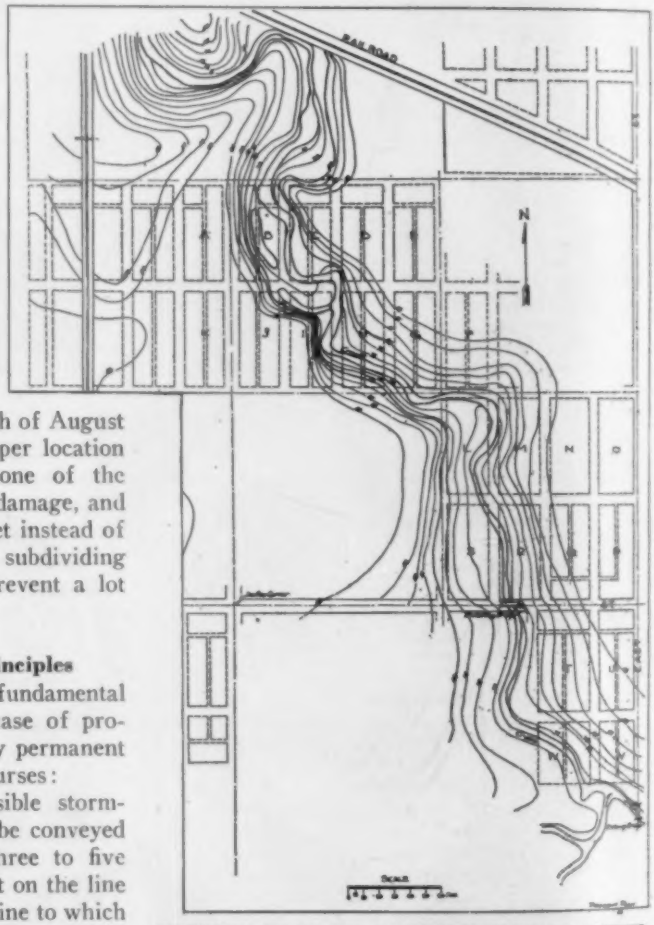
It is neither necessary nor economical to violate either of the foregoing rules, and yet they are now violated in thousands of places and the mistake is being repeated every day.

Some of the advantages of making land subdivisions to conform to the rules for natural drainage would be:

(a) Lots would not be bisected by storm-water channels.

(b) The front part of the lots on which the house stands would secure better drainage.

(c) When storm-water sewers were in-



PRESENT PLAN OF A SUBDIVISION IN WHICH LOTS HAVE BEEN LAID OUT WITHOUT REFERENCE TO THE EXISTENCE OF A CREEK WHICH DRAINS 15,000 ACRES

stalled there would be a practicable right-of-way within the public streets, thus avoiding condemnation proceedings for occupying private property, or expensive detour sewers in deep cuts.

The accompanying plat (Present Plan) illustrates the point in question. The lots have been laid out crossing a creek without reference to its existence. The creek is almost dry in the summer time and, if it had a small drainage area, it might be diverted into storm sewers located in the adjacent streets. However, this particular creek drains about 15,000 acres and in time of heavy rains discharges nearly 1,000 cubic feet of water per second. With the flat grade, which is all that is available, this flowage would require the equivalent of a storm sewer or covered conduit 10 feet high and 20 feet wide. The cost of such a structure, charged against the land benefited, is beyond the possibility of consideration. The creek must remain an open waterway.

The proper subdivision procedure in this situation would be: first, to adopt a right-of-way for either the existing or a deepened and straightened channel of the creek; second, to locate the adjacent lots and street in conformity to the right-of-way. Roadways on either side of the creek would furnish access for attractive lot frontage; on the other hand, if maximum utility per square foot of land was desired, the rear of the lots could be placed on the creek.

There are many ways of subdividing so that the streets and lots conform to drainage essentials. To illustrate the point in question, we have replatted this same subdivision. A new right-of-way for the creek has been dedicated in the low lands so that there is better run-off and less irregular cutting-up of the lots. In this new layout we have also borne in mind several local conditions, as follows:

(a) The curved and diagonal streets along the creek must merge as directly as possible into the adjacent rectangular system to the east and west.

(b) Alleys are demanded here, and we agree with them on this point.

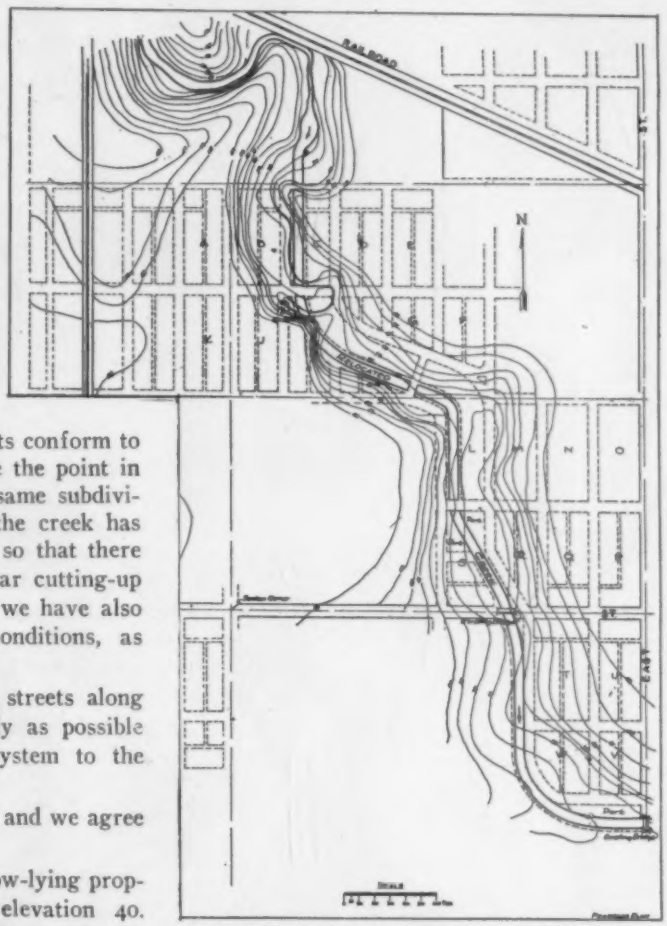
(c) In any layout of lots the low-lying property must be filled to about elevation 40. Excavation from the deepened channel in the new right-of-way will furnish a part of such filling.

Advantage of Dedicating the Relocated Creek and Land for a Small Park

Maybe the thrifty realtor will look askance at this public donation of right-of-way for the creek, a number of lots which have been trimmed, and two parcels along the creek turned into a public park in his honor. Let us look into this and set up a few figures in deadly parallel columns.

	Present Plan	Suggested Plan
Total area of subdivision (blocks A-W)	117 acres	117 acres
Acreage in creek (60 ft. wide)	7.6 acres	7.0 acres
Acreage in parks	0 acres	1.5 acres
Bridges	12	4
Platted lot frontage	26,700 lin. ft.	24,100 lin. ft.
Frontage of lots cutting creek	3,200 lin. ft.	0 lin. ft.
Net lot frontage	23,500 lin. ft.	24,100 lin. ft.

The suggested plan which conforms to drainage has more real lot frontage for the realtor to sell than does the present plan. In only one respect has the present plan an advantage for the lot seller, that is, the possibility of getting



SUGGESTED PLAN FOR REPLATTING THE SUBDIVISION SHOWN ON PAGE 360, MAKING IT CONFORM TO DRAINAGE AND SECURING MORE SALABLE LOT FRONTAGE

some misguided optimists to buy those 3,200 feet of lots in the water.

From the standpoint of the municipality it is even more important that the subdivider dedicate right-of-way for surface-water channels or storm sewers. Unless this is done, there will inevitably arise, when future drainage improvements are proposed, claims for expensive right-of-way, claims for damage to remainder by taking portions of lots, or unnecessary added costs to the municipality for construction of storm-water drains over routes that are unsuitable for this purpose.

The public officials who have charge of the approval of subdivisions can render the taxpayers of their communities a valuable service by rejecting plats which interfere with the essential requirements for drainage, and which do not provide right-of-way for natural storm-water channels and conduits.

Long Winding Strips of Open Land Essential to Prevent Depreciation of Real Estate Values in Metropolitan Areas

A Letter to the Editor of THE AMERICAN CITY from the President of the American Society of Landscape Architects

I SHOULD like to hazard an opinion regarding one of the new problems which I think the planners of cities will be forced to consider during the coming decades. By that time it is to be hoped the accommodation of vehicular transportation will have become pretty much a commonplace. Architectural excellence undoubtedly will be more general then, and better living and working conditions may be expected to be brought about. Standardization of these desirable things, however, will tend inevitably to create uniformity which upon a vast scale will become in itself objectionable.

By objectionable uniformity I mean something more than that which merely bores. I mean a uniformity which becomes actively oppressive when repeated endlessly mile after mile, no matter how complete or how attractive the objects may be in themselves. We see beginnings of depressing uniformity of excellent things in the central portion of the city of New York, and of less excellent things in the Everett-Chelsea-Somerville districts of Boston. We need to be anxious about these depressing uniformities, because they hurt the pleasantness of cities and to that extent threaten the continued earning power of the vast sums of money invested in great metropolitan regions, and they hurt the spirit of men.

The era is passing when a great city can hold out unique attractions of a compelling kind to the dweller in country districts. There was a time when great cities were maintained in spite of heavy death-rates by the incoming from villages and farms of families and workers who sought the city on account of its novelties, shelter, culture, entertainments, and its opportunities for social intercourse and employment. Today that situation is slowly tending to reverse. The urge from the great cities toward the suburbs and toward the villages is becoming stronger with the development of cheap transportation, with the growth of large isolated industrial plants, with the general provision of schools and hospitals, and with the facilities for ready construction of homes equipped with "modern improvements" of extraordinary completeness. Opportunities for recreation in natural surroundings are also acting as a strong urge toward the towns.

Parks have been built in cities to provide an opportunity to enjoy recreation in rural surroundings. However, parks in great metropolitan cities are gradually assuming a new and exceedingly valuable role quite aside from recreation spaces. The mere existence of areas of open ground covered with trees and grass is becoming an enormous asset in breaking up the monotony of great city areas. In most of our metropolitan regions strips of vacant private land still remain between the smaller integral cities and towns and give these centers sufficient local separation to save their individuality from complete eclipse in the great fabric of buildings and streets. When town after town becomes closely knitted to its neighbor, as for example the Dorchester-Roxbury district of Boston and the Brooklyn region of Greater New York, the entity of villages and towns becomes lost. The resulting monotonous repetition of street upon street and building upon building appalls the human spirit and cannot be adequately ameliorated by perfection of transportation, by excellence of architecture, by street trees or by perfect housing and attractive employment; for each of these good things tends toward its own repetition.

I think the time is fast approaching when metropolitan regions must include in their budgets of expense, moneys for the maintenance of large areas of open ground distributed in long strips or winding bands throughout the built-up area to relieve monotony of this kind, quite aside from the recreational value which the ground or the landscapes contained in such strips may possess. We have become accustomed to vast appropriations for metropolitan thoroughfares. I think we are destined to become accustomed to expenditures as great or greater for the acquisition of these open spaces required to safeguard metropolitan areas from depreciation in value through an intolerable increase in monotony resulting from too continuous up-building.

The Pull of the City on the Country is Slowly Tending to Reverse

In this letter Mr. Shurtleff points out the facts that the era is passing when a great city can hold out unique attractions of a compelling kind to the dweller in country districts; that city congestion and monotony not only hurt the spirit of men but threaten the earning power of vast sums of money; and that parks in metropolitan regions are gradually assuming a new and exceedingly valuable role, quite aside from their use as recreation space.

In coming years I think planners will devote much time to the mapping and classification of vacant lands on the outskirts of cities and towns which are being absorbed into metropolitan districts, to decide what land should be saved for permanent strips or bands of open ground, its extent, its relation to the topography of hills and stream courses and lowlands, its contact with adjacent boundary streets and transportation routes, and its most favorable time for acquisition. Evidently these strips must be wider or nearer together in cities which lack varied topography than in those whose sites are naturally diversified.

The purpose of these costly public acquisitions will be the same as that for which vaster sums are being spent constantly in private enterprises for the mere embellishment of office buildings, stores, factories and residences, namely, to secure attractive appearance. In our times not to secure attractive appearance in great private undertakings means the risk of jeopardizing all the money invested. Mere structural strength, convenience, comfort, are not enough to meet the approval of the public of our day.

The same approval must be reckoned with in our great metropolitan areas. Mere convenience of transportation, beauty of buildings, excellence of light and air conditions, absence of confusion in building heights and uses, opportunities for amusement, recreation and employment will not be enough to satisfy the man who is enmeshed too completely by walls and streets. He will demand freedom from depressing monotony of that kind in this great fabric or he will go where he can find it so readily and so cheaply in the small city or town whose call to him becomes steadily clearer.

Our metropolitan areas need the most intelligent study and watchfulness that men can apply to them to prevent this call from becoming destructive in its consequences either to the great treasure of money and culture which they contain or to the human beings, counted by millions, who depend upon the city for the environment of body and spirit.

ARTHUR A. SHURTLEFF,

Boston, Mass.

Every Toll Bridge Should Ultimately Become Public Property

HIGHWAY funds of some states are not sufficient to meet the increased demand for new and better bridges. Private persons and companies are being given unlimited franchises to build new bridges and charge tolls for the use thereof. The public is faced with a real danger that strategic points on main traveled highways will be monopolized indefinitely by toll bridges. Whenever toll bridges are necessary, they should be financed from public bond issues and should remain as toll bridges only so long as may be necessary to defray the costs of improvement, whereupon they should be free to all. If needed bridges cannot be built with public funds, the right to build and operate toll bridges should be granted to private parties upon the condition that the toll charges be reasonable and the franchises continue only for such periods as will provide a fair return on investments, whereupon the bridges shall become public property and free to all.

—A resolution adopted by the 1927 convention of the American Automobile Association.

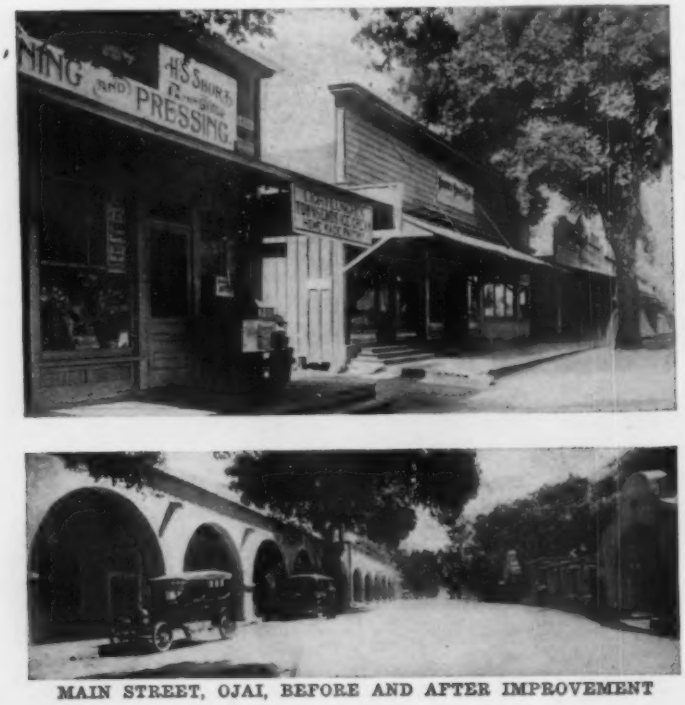
How the Little City of Ojai Achieved Architectural Distinction

By Arthur J. Secor
President, The Toledo Museum of Art

ONLY a few years ago the business section of Ojai, Calif., was commonplace and dull in appearance and as utterly lacking in distinction as the center of many another American village of that time, and this. But today, Ojai abounds with beauty of a quality and kind which make it one of the most harmonious expressions of the picturesque to be found in American communities. Where the hodge-podge of stores of all sizes and heights stood, there now stands the row of village-center shops of Spanish architecture shown in the lower illustration. The application of the arcaded sidewalk plan in this central unit of a new town scheme, established an architectural unity which has been kept throughout.

Directly across the street from the row of shops is the civic center, completely enclosed by an adobe wall which repeats and accentuates the Spanish arch motif. The wide entrances, one of which is shown at the right of the photograph, give access to a recreational area with a grove of giant live-oaks, with tennis courts, children's playgrounds, and a spacious clubhouse. Not far away, a campanile stands gracefully silhouetted against the sky. This, the visitor is surprised to learn, is the tower of the Post Office—one of the most quaintly beautiful buildings of its kind in the country. Facing it is a hotel of almost equally excellent Spanish architecture, while down the street is to be found a Roman Catholic church which is a replica of an early California mission.

Whence came the impetus for so much architectural distinction? It is a question which might well be asked by anyone interested in the civic salvation of his own town. Ojai owes her transformation to the esthetic ideals and to the enterprise of one man, a man of wealth, whose genious for creating and perpetuating beauty is his own enduring monument in Ojai and elsewhere. He was Edward Drummond Libbey, who died recently, leaving among other bequests, a large endowment to the Toledo Art Museum. Mr. Libbey, a winter visitor to the Ojai valley, was charmed by the natural beauty of the section, and the fitness of perpetuating these along with local historical traditions. He conceived a new city somewhat after the fashion of an old, fanciful "castle in Spain," but truer to the local type of building and modeled somewhat more along the lines of a rural village in the south of Spain. He set about giving his dream reality, and the renaissance of the town, including its re-christening, came about through his cooperation with local merchants and other business interests.



MAIN STREET, OJAI, BEFORE AND AFTER IMPROVEMENT

Ojai is now an incorporated city of about 1,000 inhabitants. It has solid foundations of agricultural prosperity. It has an adequate state bank, a public library, a modern lighting system, a newspaper, and two first-class hotels. Two schools there have achieved national reputation. Almost all of the town's assets, including the almost unparallel golf course and the school for boys, have been realized through the generosity of the town's patron.

Not every town, of course, can have the good fortune to find such a patron. There is a suggestion for other towns, nevertheless, in the metamorphosis of Ojai, and in the quality of cooperation shown by all local interests in carrying out the initial plan. Why might it not prove a suggestion strong enough to inspire another town here or there to go and make plans of its own, to the extent of its resources and its ability to carry them out? Why might such town not profit thereby, financially, as well as otherwise, as has Ojai?

ACKNOWLEDGMENT.—For the half-tone illustrations in this article THE AMERICAN CITY is indebted to the American Civic Association. The photographs from which the cuts were made were furnished by the Division of Farm Population and Rural Life, Bureau of Agricultural Economics, United States Department of Agriculture.

THE NEW POST OFFICE AT OJAI WITH ITS BEAUTIFUL TOWER IS IN STRIKING CONTRAST TO THE FORMER POST OFFICE SHOWN IN THE UPPER PICTURE

Primary Requirements for an Adequate System of Municipal Accounting

By Louis Brownlow

THE very foundation of any economical administration of a city's finances is its bookkeeping system. Without an adequate accounting practice based on modern methods no city can find out where it is or whither it is going. Without going into the technical details, I am going to set out what I think are the primary requirements for an adequate system of keeping the city's books, so that any citizen may know, or at least can find out, at any time exactly where the city stands financially, either as a whole or in any department of its activities.

In some states, Nebraska, Indiana, New Jersey and a few others, a uniform system of classifications of accounts is imposed upon municipalities by state law, and to some extent a uniform method of using the system is insisted upon. But with relatively few exceptions each American city is free to choose its own accounting system. Most of them have a satisfactory bookkeeping scheme, but very few carry on that scheme to the degree that gives both control of expenditures and constant knowledge of the status of affairs.

First, the city should adopt a budget system that is not merely a budget system in name, but in scientific fact; a budget system that balances the expenditures of the fiscal year against the revenues for that same year. This means accounting on the basis of accrued revenues for the year instead of on the basis of actual cash collections for that year.

Second, the city should establish the centralized accounting control of all its activities in one fiscal office.

Third, there should be absolute separation between the current operating revenues and the moneys borrowed through bond sales for capital improvements, and a corresponding separation of the expenditures from these sources.

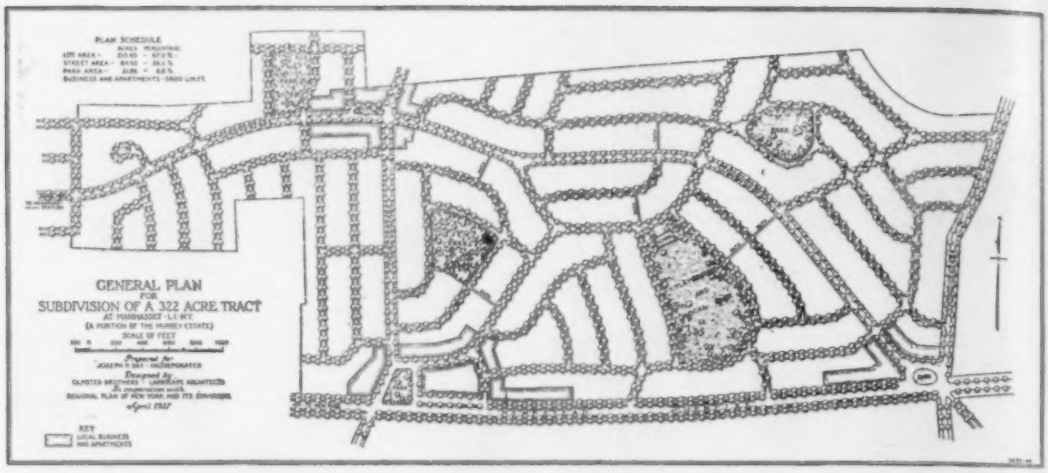
Fourth, there should be a pre-audit rather than a post-audit of accounts. In other words, a certified public accountant should be employed to audit every item of receipts and disbursements before it goes on the books, so that there is no long wait for an auditor's report that is cold and three months old when you get it.

Fifth, there should be provision for charging against every item of the budget appropriation the money to be spent out of that appropriation at the time the obligation is incurred, not waiting until the account is paid. (This is a most important single phase of the value of a modern system in controlling expenditures. It reaches right down into your own personal pocket-book.)

Sixth, this system should be such as to permit any citizen any day to find out exactly what is the status of the city, or of any department of the city, up to the close of business on the day before. There need be no lag, and the system should produce complete reports daily, or as often as required, but must be able to produce the report daily, just as is done by the bookkeeping system of a bank.

Seventh, this system must take advantage of every modern appliance of machinery in order to save time and to save money.

ACKNOWLEDGMENT.—The foregoing paragraphs are from Article XLIII of Mr. Brownlow's syndicated series of newspaper letters on "The City and the Citizen."—Copyright, 1927, by Current News Features, Inc., Washington, D. C.



Large Residential Tract to Be Undisturbed by Through Traffic

Metropolitan Museum of Art, as Legatee of Munsey Estate, Aids City and Regional Planning on Long Island

By Edward Clark Whiting

Olmsted Brothers, Landscape Architects, Brookline, Mass.

WHEN Frank A. Munsey died he left the residue of his property to the Metropolitan Museum of Art in New York. Among his assets were six or seven hundred acres of unimproved land at Manhasset, on the north side of Long Island, about eighteen miles from downtown Manhattan, and only two or three miles outside the present limits of the city of New York. It is in the rolling or hilly section of Long Island, is partially wooded, and its ground surface is modeled in unusually interesting and attractive forms. It offers particularly promising opportunities for a residential development of charm and good quality.

When the executors decided recently to sell the northern half of this tract, the President of the Museum, Robert W. De Forest, suggested that it would be the part of wisdom and foresight to secure a plan carefully worked out in accordance with the accepted general principles of city planning, and in accordance also with the specific recommendations of The Regional Plan of New York and Its Environs. The accompanying plan of "Munsey Gardens" is the result of that study. And as an example of real cooperation between interests that have all too often stood in real or fancied opposition, it should prove a stimulus to land planning that is based upon foresight and a desire for the common good of the community.

The fixed physical requirements were only two: the local county authorities stipulated that no street less than 50 feet in width would be accepted; and Joseph P. Day, the real estate man in charge, stipulated that the normal lot depth should be 100 feet. Within these limitations, the planners were free to make such recommendations as they saw fit.

Planning the Street System

On the south, the property fronts for nearly a mile on the Hempstead Turnpike, the most northerly of the main radial thoroughfares feeding into New York from Long Island. A widening of this thoroughfare to 160 feet is provided for, allowing a narrow service road on each side and a main traffic-way in the center. This section was selected as giving adequate accommodation for through traffic and at the same time minimizing the inconvenience or disturbance for residential property due to fronting on a street carrying heavy through traffic. A secondary east-and-west thoroughfare 80 feet wide is planned through the property and it is located as near to the northern boundary and as far from the turnpike on the south as topographical and other conditions permit. This street gives direct access from

this property and from points eastward to the Manhasset station. Then there are two 80-foot crosstown thoroughfares, one along the eastern boundary (an existing street widened), the other near the western edge of the main tract. The latter thoroughfare connects to the north with a street now under construction and is planned for ultimate extension southward. These through streets are so located as to leave the main block of the property, about 150 acres, undisturbed by through traffic.

Discouraging Through Traffic

To further discourage the passing of "outside" traffic through the residential areas, all other streets are narrow (one or two 60 feet and the rest 50), are planned definitely to avoid direct through connections, and are located to take the most possible advantage of the rolling topography. Directness was not considered an advantage in these local streets; instead, every effort was made to secure attractive alinement and to locate them in the best physical relation to the building sites on either side. Block lengths have been increased well beyond the old and still prevalent New York standard (600 to 700 feet)* wherever physical conditions permit—thus reducing the percentage of area given over to streets—and cross-cut paths have been provided through the longer blocks for convenience in local circulation.

Park, Playground and School Sites

Four local parks are provided in addition to the small open spaces or "squares" at the business centers. The park sites were selected to be within easy walking distance of all sections of the property and to take advantage of low-lying land ill adapted for houses but particularly well adapted for parks. One of these sites (about ten acres) is large enough for school playground and local park combined, and is near the center of the main residential unit. While the total percentage of area set aside for parks and playgrounds is not large (6.8 per cent) it is a reasonably satisfactory proportion and is far more than is often secured.

Only one school site is provided, although the size of this entire tract would normally call for two. This decision was made on the assumption that the outlying sections would ultimately and properly form parts of adjacent school districts comprising property not covered by this plan.

Local Shopping Centers

Areas for local business are designated at the three main thoroughfare intersections and, to some extent, along the Hempstead Turnpike. These business areas are large enough to serve this entire property and in part the adjacent property to the south. They can be reached with reasonable directness from all parts of the property and they are located at the points least desirable for residential development. Widenings or open areas are provided in connection with these "centers" to accommodate the parking of automobiles.

Important Features Summarized

While in many respects this plan may not be ideal, it fits the land, it provides reasonably well for public recreation, it protects the residential properties by restricting business and other alien developments to definite areas, it utilizes the longer block unit generally recognized as satisfactory since the almost universal use of automobiles, and it incorporates substantially the principle now generally becoming recognized, that through traffic should be carried around and not through a residential unit. This residential unit must obviously vary in size with the character of the development, but for a community of small single-family houses, as this is planned to be, about 160 acres normally produces enough children for one school unit; and that seems to be the logical basis to follow in predetermining the limits of the residential unit for the purposes of planning.

* EDITORIAL NOTE.—This relates to the great number of blocks, particularly in Manhattan and Brooklyn, that are 600 to 700 feet long between the avenues, and 200 feet wide between the cross-streets.

Artistic View from Airplanes Is Demanded of German Cities

BERLIN, July 19.—Germany's architecture of the future will be designed with a regard to the appearance of structures from the air. Due to the many visitors touring the country by plane, patriots are concerned that the Fatherland shall present an artistic birdseye perspective.

Lufthansa today began a schedule of trips for architects over the larger cities with a view to recommendations for improving the aspect from the air.

Roof gardens with a profusion of plants would help, some designers say, but the general form of buildings must be changed before symmetry and order can be obtained, they contend. Dirty courts invisible from the streets must go, to be replaced by trim gardens.

The architects will report with the hope that the Ministry of Culture will take official action.

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Stop Signs on Through Streets Given Special Illumination

By Andrew M. Jensen
Commissioner of Public Works, Fresno, Calif.

ON the principle that stop signs marking arterial crossings must be visible at all times, day and night, so that there can be no excuse for not observing the stops, Fresno is going about a program of individual illumination of such signs. A system of arterial stops and school stops was instituted in 1925. These were marked by painted lines and metal buttons on the street surface at the stop, and by an arrow 100 feet ahead of the stop. The school stops were later made pedestrian lanes, and any vehicle was required to stop if a pedestrian was in that half of a lane which the vehicle was approaching.

Arterial stops are now indicated by a metal sign placed on the property line at the curb. These are readily seen in the daytime, but if not lighted in some manner are scarcely visible at night, being above the area lighted by automobile headlights. When the metal signs were adopted, George M. Bowman, Electrical Engineer in the Department of Public Works, was asked to devise means of lighting them. The method that he designed is described herewith. The installation of the signs is under the direction and supervision of the Commissioner of Public Works. The scattered intersections and the more important crossings of the main arterial streets only have been lighted; the remainder will be lighted within the next few months, when money for doing so will be available. The system of stops is thoroughly warranted and justified, having reduced the accidents to almost nothing at all intersections where they are installed; and the lighting of the signs, even though a little expensive, is absolutely necessary in order that the proper results may be attained.

Details of Construction and Mounting

The details of the standard lighted sign are shown in the accompanying drawing. In order to make the signs most effective, they were mounted at heights which meet the motorist's eye. When nothing interferes, the most suitable height is 6 feet 7½ inches from curb grade to center of signs. At certain of the intersections adjacent to the downtown district the signs had to be raised to 8 feet so that they could be seen over the tops of automobiles parked in front of them. The result is that all the signs are visible under all conditions.

The points to be considered in lighting the arterial stop signs are that the signs should stand out in the same color at night as in the day and that some means of attracting the motorist's attention to the signs should be devised. In order to furnish light according to the above specifications, it was necessary to use a reflector designed to furnish white light for the sign and red light for the warning light. After a careful study of available commercial reflectors the No. 32613 Benjamin reflector fitted with a No. 586 socket was chosen. The No. 586 socket is necessary, as it is a locking type of socket and prevents theft of lamps. The blinking is done by means of a button type blinker placed in the lamp socket and held in place by the base of the lamp. Fifteen-watt lamps are used on signs adjacent to electrolier systems, and 25-watt lamps on signs at isolated intersections.

The installation of all signs, whether lighted at present or not, was such that everything necessary for the lighting of the signs could be accomplished at any time without any changes.

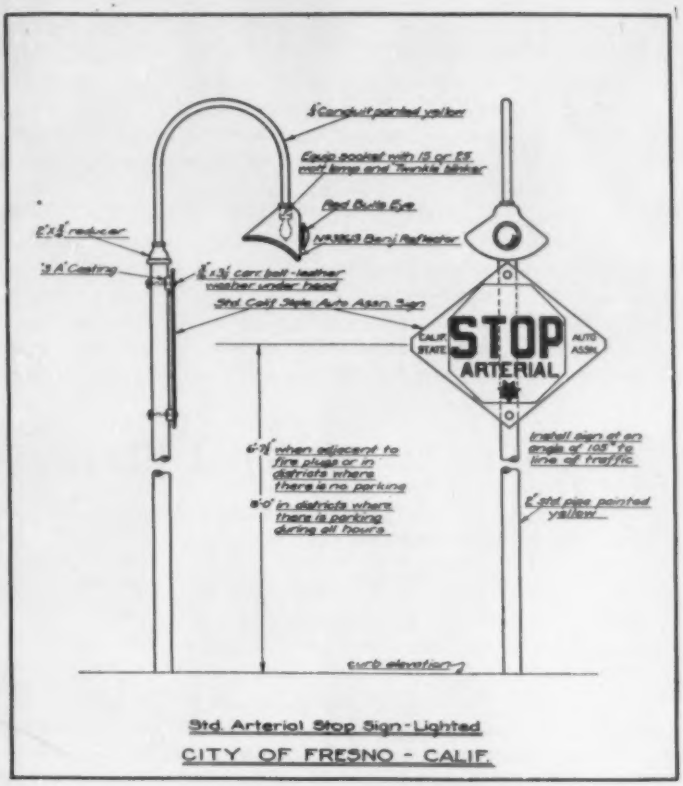
Sources of Energy

There are two sources of energy available for lighting the stop signs, one being the series or multiple electrolier systems and the other the 120-240-volt secondary services of the local power company. Lighting the signs from the multiple electrolier system of 110-220 volts is an easy matter, as it is only necessary to connect the sign circuit to the lamp side of the fuse block in the base of the electrolier. Lighting the signs from the series electrolier system presents a different problem, as the series lamp circuits are either of 6.6- or of 20-ampere rating. Further, it is desired to use standard 120-volt lamps in the signs, so it is necessary, therefore, to provide standard secondary voltage from the series circuit. This is accomplished by the use of series lighting transformers of proper capacity which furnish

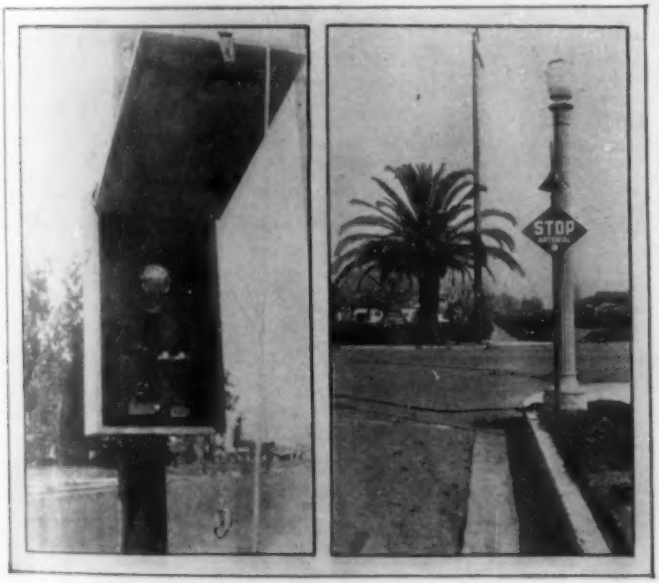
the desired secondary voltage. All circuits from the electroliers to the signs consist of rubber-covered copper wire in the underground conduit or 2-conductor No. 14 parkway cable. The control of the lighting of the stop signs adjacent to electrolier systems is automatically taken care of by the electriolier system control.

The outlying stop signs at distances greater than 600 feet from the electrolier systems are lighted from the local power company secondaries and are controlled by means of No. 230 Tork time-switches set in accordance with the street-lighting schedule. Each sign installation is equipped with an outdoor meter-box containing a service switch, a meter and a time-switch, mounted on a 4-inch x 6-inch x 24-foot redwood pole set 5 feet in the ground. All circuits from the meter-box to the signs consist of two No. 12 S.B.R.C. copper wires in 1-inch conduit.

All sign standards are installed 12 inches from the street side of the curb and opposite the property lines except in cases where poles interfere. After installation, each complete sign is given two coats of yellow traffic paint. A total of 149 stop signs has been installed up to July, 1927; 67 of these are lighted.



Std. Arterial Stop Sign-Lighted
CITY OF FRESNO - CALIF.



LEFT.—OUTLYING CONTROL STATION, IN FRESNO, SHOWING SERVICE SWITCH, TIME CLOCK AND METER. RIGHT.—STOP SIGN LIGHTED FROM ELECTROLIER SYSTEM

Cost of Signs

The cost of installation of the signs varied with the locality in which they were installed. The average costs per sign, however, were as follows:

Unlighted sign	$5.28
Lighted sign adjacent to multiple electrolier system	16.55
Lighted sign adjacent to series electrolier system	26.35
Lighted sign, outlying	78.40

When the installation is adjacent to a series electrolier and it is necessary to change the existing transformer to one supplying energy at a standard secondary voltage, the above cost of $26.35 can be reduced to $18.00, as the removed transformer lamp and socket can be used in future maintenance work.

The maintenance costs for the stop signs to date has been very

low, as the only expense is that due to renewals of lamps and flashers, and a few cases of repainting. The life of the flashers is guaranteed to be equal to that of the lamp (1,000 hours) and at present there are installations where the flashers have been operating ten hours per night for the past nine months. The State Automobile Association maintains the sign proper and paints the standard; the electrical part is maintained by the Department of Public Works.

The cost of energy for operating one sign, using a 15-watt lamp, from the electrolier system is about $0.11 per month, with energy at $0.02 per kilowatt hour. For the outlying lamps the charge per sign is $0.50 per month, figured at the minimum meter charge of $1.00 per month for two 15-watt lamps.

The results of the stop sign installations have been very satisfactory and the general public seems well pleased with them. Not only do the arterial stop signs cause people to stop at the intersections so marked, but they also cause an instinctive stopping or slowing-down at other important intersections or main arteries. Since their installation the total accidents in the city have been reduced about 35 per cent, and when all the signs are lighted the percentage will be higher.

Raising Educational Standards for Police

AT the recent (1927) convention of the International Association of Chiefs of Police, held in Windsor, Ont., an address on "Police Education" was delivered by William H. Funston, Chief of Police at Schenectady, N. Y. Realizing that what he had to say might be displeasing to some—the very fact of which would tend to show its need—he proceeded to analyze the educational deficiencies of the police profession.

The present method of admitting applicants to membership in the police force is based primarily on (a) physical examination, (b) moral and character examination, and (c) civil service examination. As to the first of these, Chief Funston said the examination should be as rigid and thorough as an examination of recruits in the United States Army, and that police surgeons concerned should be thoroughly acquainted with the army procedure. Considerable variation as to thoroughness exists at present among the cities. As to character examination, he stated that this was satisfactorily done in only a few places, the investigators ordinarily not being familiar with such work. Civil service examinations, excepting in very large cities where civil service commissions are non-political, the number of examiners large and the qualifications high, are often nearly farces. The commissioners themselves frequently lack the education requisite for a competent examiner.

In the last few years a more serious attempt has been made to establish police schools in the larger cities, and also state police schools, usually managed by officers of the state constabulary; but in thousands of municipalities and in many states no such schools have been established, while those that exist are of short duration and can be classified only as an additional contribution to the education of policemen. As a law student in New York State must have had at least four years of high school, how can it be supposed that satisfactory results can be obtained from lecturing on the law of criminal evidence, the law of arrest, various subdivisions of the penal law and the elements of scientific investigation to men who, in a great many cases, did not even graduate from grammar school? While it is true that many of the best policemen never saw the inside of a high school, and many of the shrewdest of detectives are not high-school graduates, these facts only prove that good men rise in spite of handicaps—and might have risen more quickly with education. Many of the criminals with whom the policeman has to deal have had high-school educations. With the ratio of crimes committed to crimes detected—and to convictions—two to one, it would seem that the average criminal is just a little ahead of the average police officer; and, even in case of a detection, poor preparation of records and bad impressions on juries often interfere with the making of convictions.

After outlining the foregoing state of affairs as he sees it, Chief Funston suggested that a high-school education be made a requirement for police recruits in first- and second-class cities, with a two-year requirement in the smaller places; that state police schools assisted by the state universities and police systems be established; and that promotions in the service be based not only upon civil service examinations, but also upon the work done in city or state police schools.

Curriculum Suggested

The following sample curriculum for such schools was submitted:

1. Civics, covering the basic elements of government in general, with special application to the government of the municipality of the student.
2. Proceedings before a magistrate and, in first class cities, proceedings before a Court of Special Sessions, Juvenile Court and Traffic Court.
3. The study of the notebook—registration of all facts observed.
4. Police ethics—covering relation of the police to the public.
5. General crime classification and forms in criminal proceedings.
6. First aid to the injured.
7. Laws of arrest.
8. Search warrants.
9. Inspection of place of public assembly.
10. The study of tramps, vagrants, prostitutes and mental defectives.
11. The elements of photography and fingerprinting.
12. Mechanics in general, with special application to automobiles.
13. Investigation of arson, explosions and homicides, including study of narcotics, poisons and combustibles.
14. General laws, such as sanitary, agricultural, narcotics and prohibition.
15. The study of assault, burglary and homicide.
16. The gambling problem, liquor problem, and houses of prostitution.
17. Pickpockets, larceny, swindles, etc.
18. General traffic laws.
19. Proceedings before a grand jury and higher courts.
20. All this should be supplemented by psychological and memory tests, calisthenics, military drill and thorough knowledge of the revolver.

A School-Building Program for a Community Facing Unusual Growth

By N. L. Engelhardt and J. E. Gibson
Teachers College, Columbia University, New York City

HISTORIC Fort Lee, N. J., is situated across the Hudson River from the upper part of Manhattan Island, New York City. Although less than a mile west of Broadway, as the crow flies, this borough, about 2.8 square miles in area, had in 1926 an estimated population of only 7,078. It is practically certain, however, that the population of Fort Lee will increase very rapidly in the future on account of the construction of the Hudson River Bridge. The population pressure of New York City, released by this further outlet, may be expected to produce startling growth in Fort Lee just as in other districts that have been connected by bridges, tubes, or ferries with Manhattan Island. Such a prospect may well cause the municipal engineer to envision problems of water-supply, lighting, street paving and city zoning which attend rapid development.

Until recently in most American communities, the public schools have been allowed to develop along haphazard lines, lagging behind the needs of the community. As long as community growth is slow and the adjustments readily made among a tolerant people, this lack of plan and this lagging tendency do not attract general attention. Indeed, it is estimated that 20 per cent of the funds is wasted because of lack of knowledge of the educational program to be served and because of ignorance of the economy of schoolhouse planning. But let the community undergo any rapid development, and the wholesale adjustments that are forced upon the school system cannot be made on the old basis.

A New Technique in Educational Administration

The educational authorities of Fort Lee, when confronted by prospects so unusual and uncertain, turned for guidance to experts in this field. The Institute of Educational Research, Division of Field Studies, Teachers College, Columbia University, was engaged to make a survey of educational needs in Fort Lee, present and future.

In September, 1926, Drs. George D. Strayer and N. L. Engelhardt and others, assisted by thirty graduates in educational administration, began this survey in Fort Lee. The survey was completed in January, 1927. While every phase of the educational problem was studied, only the factors influencing the proposals for a building program are reviewed in this article.

Taking Stock of the Present Situation

In order to understand the present situation as to population distribution and utility of present plant, the following things were done: (1) A block survey was made and from it a building map of Fort Lee was drawn, showing the location of every residence or structure of any kind. (2) The distribution of the residences of high school children and of elementary school children was studied, and dot maps were made showing also the location of the buildings of the present plant. (3) By the use of the Strayer-Engelhardt Building Score Cards and Standards for School Buildings, each building of the present plant was evaluated. (4) Building and room utilization studies were made to show the extent to which the present plant is being used.

Future Growth Predicted

Data based on population growth in other districts in the metropolitan area, traffic counts, and numerous other sources were the basis for predicting future growth in Fort Lee.

For example, although Brooklyn had previously been growing very rapidly, there occurred there, during the seven years following the completion of the Brooklyn Bridge in 1883, an accelerated, or "generated," * growth of something more than 11 per cent; during the next ten years a generated growth of 13 per cent; and during the ten-year period from 1900 to 1910, a generated growth of 15 per cent. For communities that have in recent years been connected with Manhattan Island by some improved channel of transportation, such as bridges, terminals or improved ferries, the generated population percentages have exceeded those given for Brooklyn. This has been due during the past fifteen years, no doubt, to

* By generated population is meant, in this case, the population increase, in excess of the normal increase, due solely to the improvement in transportation.

PRESENT DISTRIBUTION OF ALL JUNIOR AND HIGH SCHOOL STUDENTS ACCORDING TO RESIDENCE

Each dot represents the house of a student. There are 262 students living north of the geographic center and 129 students to the south. The first secondary school unit should be in the northern section. Five hundred ninety-three elementary children live north of the geographic center and 264 elementary children south of this point

changed conditions. The greatly increased use by communities of automobiles and other motor transportation has made this possible. Indeed the plans for the first unit of the Hudson River Bridge provide for no other form of rapid vehicular transportation. The survey staff therefore concluded that there may be expected, under these conditions, a generated population in Fort Lee of at least 17 per cent for the ten-year period following the opening of the bridge.

The population of Fort Lee in 1910 was 4,472 and in 1920 was 5,761. The per cent of increase for the decade was 22.4 per cent, considerably less than the rate of increase for the whole of Bergen County, in which Fort Lee is located, which was 34.5 per cent for the same period. As has been stated, the estimated population in 1926 was 7,078. If the population were to continue to increase at this rate and without any additional impetus, a population of about 9,000 might be expected in 1930, and about 13,000 in 1940. When a combination of the normal growth and generated growth factors was made, the predictable population for 1940 was at 15,000.

When the Bridge is Completed

While the amount of Fort Lee population was figured on the basis of a complete building-up of the community with houses of the present two-family type, it was pointed out that with the completion of the bridge there might be expected the type of construction that prevails in the Washington Heights community just across the river from Fort Lee, namely, ten-story apartments. Accordingly, the following table was prepared from studies of conditions in Washington Heights:

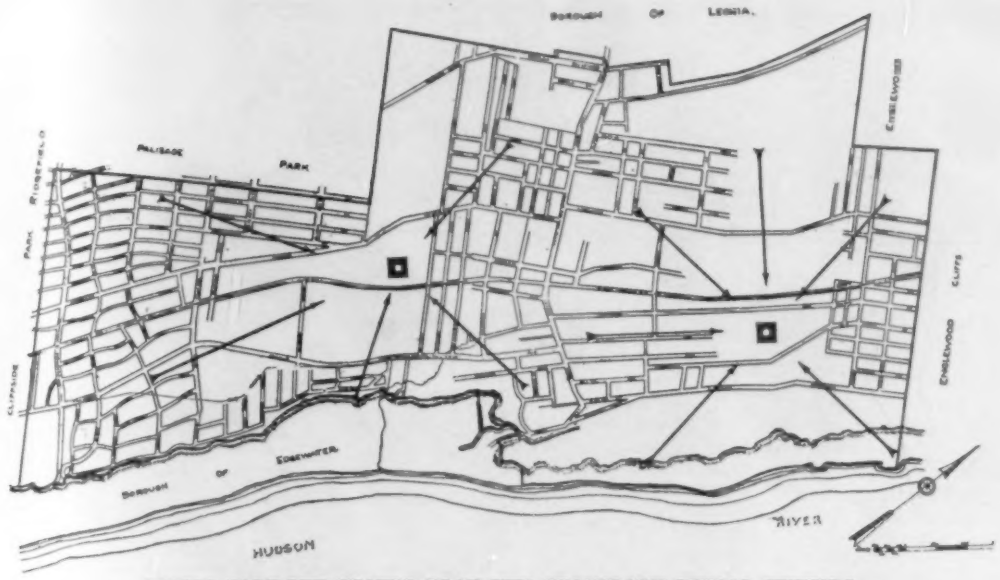
THE FUTURE POPULATION OF FORT LEE PREDICTED ON THE BASIS OF VARIOUS TYPES OF RESIDENTIAL CHANGES

Per Cent of Area Devoted to Present Type of Homes	Per Cent of Area Devoted to Five-Story Apartment Houses	Predicted Population
50	0	15,000 to 20,000
50	5	35,000 " 60,000
50	10	95,000 " 100,000
100	0	30,000 " 40,000
80	0	24,000 " 32,000
80	10	104,000 " 112,000
95	5	68,500 " 78,000
90	10	107,000 " 116,000

In order further to emphasize possibilities, the map of Fort Lee was superimposed upon this section of New York City; it reached from 136th Street to 189th Street, and from the Hudson River across the Harlem River into the Borough of the Bronx. This territory, although it includes numerous parks, open spaces, and a part of the Hudson River, has a population of 240,000.

Recommendations

A fifteen-year building program was recommended, to be followed by steps as population increases create needs. In it the significance and importance of adequate and safe buildings and of adequate sites were shown. The Board was commended for its foresight in already having purchased a ten-acre site for a high



WHERE FORT LEE SHOULD PLAN TWO SECONDARY SCHOOL CENTERS
The small square to the north indicates the center where a building should first be provided

school, and it was urged to anticipate future large enrollments by buying sites or extending present sites for four elementary school centers, two junior high school centers and one senior high school center.

The word "center" is used advisedly, because, as shown in the report, the adequacy of the educational program is dependent not merely upon the structure of the building, but upon the size of the grounds (at least ten acres for high schools and from five to ten for elementary schools), environment, accessibility and other factors. Many a fine school building in this country has its usefulness circumscribed by its location on one city block.

The steps of the survey report embodied as important features a statement of educational and construction standards for each type of building, and suggestions for the utilization or disposition of the buildings of the present plant. The report pointed out the need for a more thoroughgoing maintenance of school property. A chapter on finance showed costs of the several steps of the program and effects upon tax rate.

That the survey report was adopted in its entirety by the Board of Education of Fort Lee when it was presented to them in January, 1927, is proof that it was not the idle guess of closet philosophers but a fact-finding and fact-interpreting survey made by experienced community engineers.

Compulsory Insurance Will Further Scientific Accident Prevention

THE total number of Americans killed and wounded in the World War was about 242,000, but the total number of Americans killed or disabled by automobiles during the past two years was more than four and a half times that many. This year the number will be larger than last, and under present conditions will continue to increase with the ever-increasing number of motor vehicles. "It will not do to say that this is an individual problem with which the state has no concern," urges Robert S. Marx, a Chicago attorney, writing in the *National Municipal Review* for August.

"The menace to the life and health of the inhabitants of the state is so great that it endangers every person who is compelled to use the public highways, and justifies the state in taking action to protect the life and well-being of its citizens . . . Fundamental measures are required which will apply to every automobile owner and operator and which will protect and compensate every victim."

Compulsory compensation insurance as a preliminary condition to obtaining drivers' license is the remedy which Mr. Marx outlines and describes in detail in its possible working out. Advantages of the proposed plan he sees accruing to the victim, the automobile owner, and the general public, none of which are assured justice through the present personal injury claims arising from automobile accidents which constitute three-quarters of all civil jury trials in the courts today.

"This emergency demands prompt social and legal action, and compulsory automobile insurance will go far toward stopping the increasing toll of death and injury and will bring compensation into hundreds of homes now rendered desolate and destitute by fatal accidents or disabling injuries . . . The chief advantage of the proposed plan to the public is that it will enable society to control accidents. We will then know three things which are now unknown: the *persons* who cause accidents; how accident prevention and to scientifically eradicate the *causes* of the *places* where accidents occur; and the true *causes* which contribute to accidents."

Forward Steps

Reported by Municipal Officials, Chamber of Commerce Executives and Others

Two Important Forward Steps in Kenosha, Wis.

1.—*The vacation and replatting of Wallis Park Subdivision to make it conform to the City Plan.*

The Wallis Park Subdivision was a plat containing 48 lots. This plat was dedicated and recorded approximately twenty years ago. There were no other subdivisions of property in this immediate neighborhood when this property was platted, so the owner platted it to suit his then fancy. The property was platted so that the long side of the blocks extended in an east-and-west direction.

In 1922 and 1923 it was found in making our City Plan and Major Street Plan that it was most advisable to have the blocks extend in a north-and-south direction, instead of in an east-and-west direction as provided in this Wallis Park Plat. This Wallis Park Plat, therefore, acted as a barrier in the extension of the necessary streets in our new street plan. There were ten individual owners of property in the subdivision, besides two who were purchasing lots on land contract. The City Council authorized the City Manager to negotiate with the owners to have the plat vacated and replatted to conform with the City Plan and with adjoining subdivisions.

Conferences were held with the owners, a new proposed plat was made, and agreements were made with the owners whereby they were to exchange their lots in the old Wallis Park Plat for lots in the new plat. The City Manager was appointed trustee, and all the owners in the old Wallis Park Plat deeded their property to the City Manager, as trustee. The City Manager then went through the legal procedure of vacating this old Wallis Park Plat, and as soon as it was vacated, he filed the new Wallis Park Plat and deeded to the individual owners the lots that had been previously agreed upon in the exchange.

The new plat gave each owner more area than he owned in the original plat, because of the rearrangement of streets and lots. It made a plat that conformed to the street plan of the surrounding property, and with this change we have been able to extend the streets as provided in our Major Street Plan. It required about eighteen months to vacate the old plat and replat the property.

2.—*During last year* 13.2 *acres of property were dedicated to the city for park, playground, and other public purposes by owners of new subdivisions.*

The City Plan Commission of the city of Kenosha has adopted a definite set of rules and regulations governing the platting of property. These provide that when a piece of property is platted, the owner platting or subdividing the property is required to dedicate at least 5 per cent of the area to the public for parks, playgrounds, or other public use. This 13.2 acres is the sum total of the 5 per cent of the dedications during the year 1926. The dedications vary in size, depending upon the acreage of the property platted.

One of the interesting dedications during last year was a plat which called for the dedication of approximately three acres for park, playground, or public use. The School Board of Kenosha decided that it should have a school site on this property that was being platted, so the owners of the property dedicated 5 per cent, or three acres, towards a school site and the city bought the adjoining three acres, making a school site of six acres at a very reasonable cost. The owners of this subdivision used the fact that they had dedicated a school site as one of their big selling arguments and sold a great many lots because the purchasers were assured of a school near home for their children to attend. It is the intention of the City Plan Commission that in requiring this dedication of 5 per cent the city shall acquire many small open spaces that can be used for recreation and playground purposes. This is a safety measure, because it will help to keep the children off the street, giving them a place in each new subdivision for a neighborhood playground.

It should be explained, perhaps, that the Wisconsin state law gives city plan commissions authority over platting for a distance of three miles outside of the city limits. This state law also gives the commissions authority to make certain rules and regulations governing the platting and subdividing of property. Under this authority the City Plan Commission in Kenosha has adopted subdivision rules which require that at least 5 per cent of the area shall be dedicated for parks, playgrounds and other public use. No case has yet been taken to the courts under this law. On the contrary, we have had very hearty co-operation from all subdividers in this matter of dedication of areas for park and other public use.

C. M. OSBORN,
City Manager.

East Chicago Survey Recommends Increased Playing Space

EAST CHICAGO, IND.—"Work while you work; play while you play," might be the motto of East Chicago, which (with forty-one industries having an assessed valuation of $100,000,000, and an annual factory payroll of $40,000,000)) is uniquely a center of activities in America's seven outstanding productive industries. The 25,000 industrial workers and other elements of the population impartially indulge in programs of recreation almost as broad and as efficiently organized as is local industry. Under the Recreation Department, which is financed by municipal taxation, almost every conceivable form of leisure-time activity is carried on, from crocheting doll slippers to staging big

RILEY PARK, EAST CHICAGO, IND.

boxing-bouts. Programs are year-round, with special emphasis on summer playground interests. The extent to which the eight playgrounds are patronized will be suggested by the facts that 8,000 Easter eggs (which Boy Scouts and Girl Scouts helped the Recreation Department hide) were "hunted" by almost as many alert youngsters; that 6,000 children participated in May Day Fêtes in Washington, Riley and Tod Parks; and that this year a Labor Day Community Celebration is being held which promises to be equally as interesting as that of last year, when 20,000 people participated. This year, as last, there will be a big parade with prizes, donated by the industries and other interests, for the best floats. There will be speaking, dancing, band concerts, baseball, races, athletic demonstrations—in short, something for everybody to do.

East Chicago has a 1,500-foot stretch of beach front on Lake Michigan, and in addition to this a $48,000 swimming pool in one of the public parks, which is operated entirely without charge. Through the cooperation of local industry bandstands have been erected in Washington and City Hall Parks, and summer concerts are given weekly.

The attractive stretches of shady green of the parks are particularly a point of local pride, since they represent transformed stretches of sandy prairie land. Washington Park was formerly waste land. But, typical of the modern city with something of a park system and a healthy developed and fast-growing recreation program, East Chicago is already looking into the future and planning more open space; is already realizing keenly the inadequately distributed play places; and has already made an official survey for a complete park and boulevard system. This survey recommends more than quadruple the present play space and, if its recommendations are realized, will provide, among other facilities, twelve smaller

WASHINGTON PARK, EAST CHICAGO, A TRANSFORMED STRETCH OF SANDY PRAIRIE LAND

playgrounds, so that when it is not convenient for the juvenile element to play in the larger public parks, they may play nearer home.

H. R. PACKARD,
Secretary-Manager, East Chicago Chamber of Commerce.

Lighting Intensity for Wider Woodward Avenue Greatly Increased

DETROIT, MICH.—New street lighting that has recently been installed on Woodward Avenue (Detroit's Main Street) between Adams Avenue and the Highland Park limits increases the lighting more than five times the amount previously furnished by the old magnetite arc lamps. The improvement was brought about as a result of the organized and persistent efforts of the Woodward Avenue Improvement Association, which sponsored the increased lighting and fought for the appropriation, finally getting the Council to reinstate this appropriation after the Mayor had deleted it from the budget.

This Association conducted a mail survey securing data regarding the amount of illumination on main streets in all the cities of the United States with a population of 25,000 or more. Armed with these facts, they were able to show the Council that the increased lighting was a real necessity, and they won their battle.

Woodward Avenue is to be widened between

NEW LIGHTING UNITS ON WOODWARD AVENUE, DETROIT

Adams Avenue and the Highland Park limits from its present width of 74 feet to a proposed width of 120 feet. This involves slicing off the buildings, and the cost of the widening project is estimated at $18,000,000. This widening is to be connected up with the Woodward Super-Highway, which is 204 feet all the way from Detroit to Pontiac, and is known as the world's widest and finest highway.

More than 300 new lights were installed on the same poles formerly used for the arc lamps. These new lights are known as Westinghouse Luxsolite units and are furnished with Mazda lamps of 1,500 candlepower, inclosed in globes of bluish-tinted glass producing a daylight effect. The outer surface of the globes has a rectilinear finish which gives a sparkling appearance when lighted.

The Woodward Avenue Improvement Association expects to bring about the installation of a great super-white-way ornamental lighting system on Woodward Avenue following the widening, which will produce more than three thousand lumens per linear foot of street, and will exceed even the recently installed State Street lighting system in Chicago. It is expected that the property owners and merchants will bear the major portion of the cost of this installation.

JOHN W. CHANDLER,
Secretary-General Manager, Woodward Avenue Improvement Association.

Riverside Park: A Monument to the Civic Spirit of Independence

INDEPENDENCE, KANS.—Riverside Park at Independence is one of the best natural parks in the state of Kansas and one of the most beautiful in the country. Its 113 acres contain numerous scenic driveways through landscaped stretches where flower-beds, bird-houses, natural pools, picnic nooks, and other attractive spots abound. Its recreational facilities include a children's playground well equipped with modern apparatus, a modern tourist camp with a large camp house and garage; a baseball park with a cement grandstand; a shelter house known as the Stich Memorial, since it was erected to commemorate a pioneer Kansas banker, A. C. Stich; a cinder running track; a cement bandstand set in a wide natural amphitheatre where weekly concerts are held in summer; a swimming pool for adults, and wading pools for children; and tennis courts where the annual Kansas Open State Tourney is held. In winter, a natural lake and a special pond afford skating.

The newest feature of the park is a zoo, built (except for $100 paid by the city) by donation. The larger animals, including several varieties of bear, bobcats, raccoons, and coyotes, den in a series of natural caves, while deer, monkeys, and smaller animals are housed on higher ground. Pheasants have been added to the variety of birds already kept in the park, and pheasant breeding is being undertaken on a large scale.

Riverside Park was started in 1914, when a group of public-spirited citizens presented to the city 14 acres of bluff land lying along the Verdigris river. The city subsequently added 14 acres purchased for water-works purposes. The Union Traction Company donated 33 acres shortly after the establishment of the park, and subsequent donations and purchases have increased the park to its present acreage. It was started just thirteen years ago and the value of its present-day improvements total about $160,000. Active interest in beautifying and conserving the already great natural beauty of the scenery has, during the past five years, made Riverside Park one of the show places of Kansas. It is a scene of activity practically all winter as well as during the summer, people coming from long distances to enjoy its recreational facilities.

PART OF CHILDREN'S PLAYGROUND, RIVERSIDE PARK, INDEPENDENCE, KANS.

Mayor C. H. Kerr cannot be given too much credit for the development of the park. He held his present office at the time of the first donation, became then trustee of the funds, and has since taken an active interest in the park's promotion. Mayor Kerr returned from an eastern tour last year with many progressive ideas on park improvement which are being carried out. The late George E. Kessler, of St. Louis, made the original plan. Public-spirited individuals have donated money; several firms have contributed money and material; and, altogether, Riverside Park stands today a monument to the civic spirit of Independence.

M. E. CLAMPITT,

VERDIGRIS RIVER, RIVERSIDE PARK

Flashing Light Protects Safety Zone

SAN FRANCISCO, CALIF.—To obviate reasonable excuse for any motorist failing after nightfall to steer clear of the "post-in-socket" safety station installed on Market Street at Stockton Street (by the Down Town Association of San Francisco), there has been installed at its eastern end an eight-foot standard surmounted by a flashlight showing white and red. While the steel posts protect people within the zone, the new light device performs similar service for drivers approaching it.

In the above picture Traffic Officer Michael McCarthy is explaining to President Constant J. Auger and Arthur R. Fennimore, chairman of the Association's traffic committee, how the flashlight operates. Cognizance of the warning cannot be avoided by any driver who is neither sightless nor wilfully seeking damage to his vehicle and himself.

Since the zone was installed, more than a year ago, not a single person within its boundaries has been injured, but there have been several after-dark collisions with its sturdy posts by cars recklessly steered, whose drivers afterward claimed that they had not seen the stationary red lamp at its eastern end. Installation of the lofty flashlight shatters credence in any such plea.

JOSEPH M. CUMMING,
Executive Secretary, Down Town Association.

Ithaca Achieves Greater Equity in Tax Burden Distribution

ITHACA, N. Y.—As the result of a new system of real estate assessment recently installed in this city, a substantial increase in assessed valuation and a corresponding reduction in tax rates have become effective. The Ithaca plan was similar to that used with such excellent results in Jamestown, N. Y., some time ago* and the same concern, the Manufacturers Appraisal Company, of Philadelphia, directed the work. Street valuation maps not unlike those made in Jamestown were used.

The following figures indicate the results accomplished:

The total taxable valuation in 1926 was $22,735,306. Under the revised system this year, $32,076,585. The tax rate in 1926 was $15.60 per $1000. This year it is $11.40 per $1000 with a slight increase in the total levy last year.

W. O. KERR,
City Clerk.

* For a complete description of the Jamestown revision, see "More Equitable Taxation by Scientific Assessment of Real Estate," by Mayor Carlson of that city, in THE AMERICAN CITY, October, 1926, pp. 497-500.

A Community Advertising Campaign Analyzed

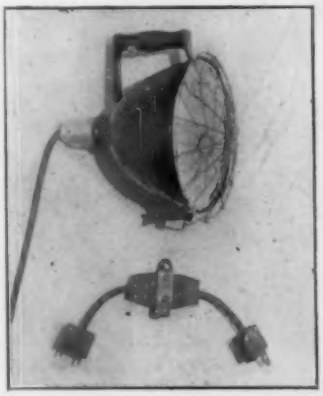
Karl Lehmann, Secretary of the Orange County Chamber of Commerce, Orlando, Fla., has rendered a valuable service to his fellow secretaries in the publication of an illustrated leaflet in which are presented facts and figures regarding Orange County's campaign of advertising and publicity during the last five years. The three principal methods used—paid advertising, publicity through articles and pictures, and exhibits at expositions—are outlined and appraised. The procedure of the Orange County Chamber in keying advertisements and in following up the resulting inquiries is exceptionally thorough.

A copy of the leaflet is obtainable on application to Mr. Lehmann at Box 1470, Orlando.

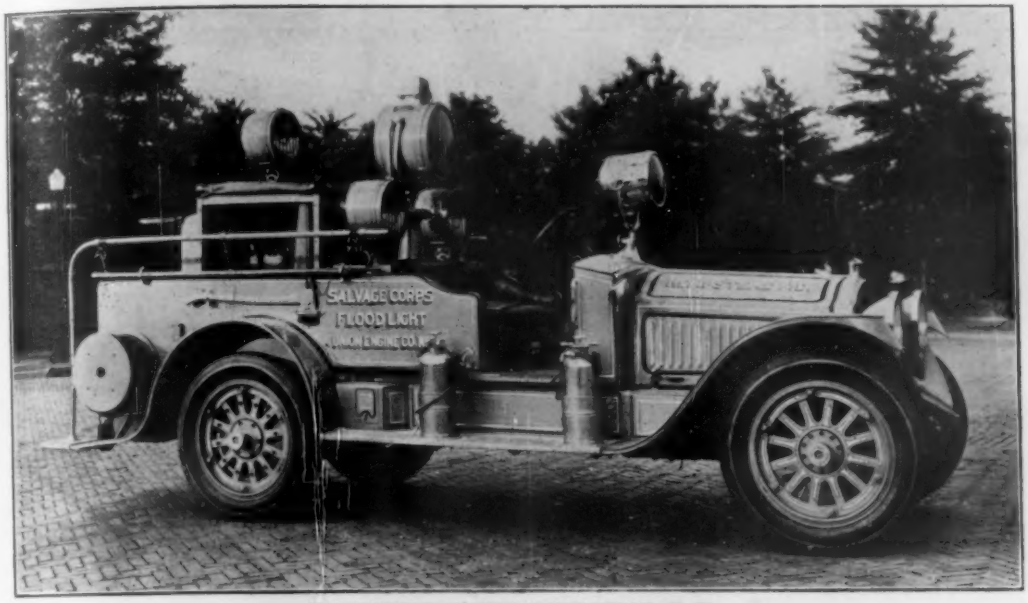
Floodlight Truck Equipped with Eleven Lights Aids Hempstead Fire Department

FOLLOWING the example set by a number of progressive fire departments, Hempstead, N. Y., has added to its equipment a floodlight truck to furnish ample illumination at scenes of fires, in order to assist firemen in placing ladders in rescue work and in the transmission of signals from the men at the fire to those looking after the apparatus.

August Oman, an officer of the Department, helped to design and build the equipment. The truck is a 1918 Twin Six Packard, on which is mounted a Universal 4-kilowatt, 110-volt generating plant. The lights consist of one 1000-watt Crouse-Hinds floodlight, mounted upon a pedestal; one 500-watt Carlisle & Finch swivel light; three



TYPE OF 200-WATT HAND LIGHT USED WITH HEMPSTEAD FLOODLIGHT TRUCK



FLOODLIGHT TRUCK, HEMPSTEAD, N. Y.

250-watt Crouse-Hinds portable lights; and six 250-watt hand lights, designed by Mr. Oman. The lights are connected to the switchboard of the lighting plant by cable mounted on wheels for convenience in handling. The cable is made in 50-ft. lengths, similar to the hose. It is equipped with one-, two- and three-way kleagle plugs, and has a total length of more than 1600 feet.

The Amber Traffic Light—Help or Hindrance to Safety?

THE importance of a more thorough and scientific study than has yet been made of the value of the yellow or amber light in traffic regulation was stressed in a Progress Report submitted at the recent 1927 convention of the National Highway Traffic Association by the Committee on Electric Traffic Signals at Intersections. On this subject the report said:

"The use of the yellow light has been so generally misunderstood by the public, and, indeed, by many traffic officials themselves, that a movement is now on foot, in certain sections of the country, to eliminate it entirely from traffic signal control. Your committee feels that this is an important matter and one which should be considered with utmost seriousness. It is felt that the use of the yellow light may be of great importance to the safe movement of traffic and pedestrians, if properly handled, and the discontinuance of such a caution signal might have serious results.

"Present traffic signal operation provides that where a yellow light is used, it is an indication to the standing and moving vehicle that the signal is about to change. The result is that the driver of the standing vehicle is apt to anticipate the change and start on the yellow light without waiting for the green, while the driver of the moving vehicle speeds up in an endeavor to beat out the light. The yellow light is not a "Stop" signal. It is a cautionary signal and should be used as such. To the driver of a moving car the yellow signal should mean that the change is about to come and that if he is in the intersection or so close to it that he cannot stop without jamming on his brakes for a sudden stop that might endanger following traffic, he should continue across.

GREEN—YELLOW—RED—GREEN SUGGESTED

"The intersection can and should be clear of all moving traffic when the red light appears. The red light is a "Stop" signal, and no driver should under any circumstances pass it. The driver waiting on a red light has no inclination to start as long as this signal confronts him. It is only when a yellow signal appears that he is inclined to anticipate his right to start. No yellow light therefore should be displayed after the red. Neither should there be any dark interval between the time the red goes off and the green comes on. When the green light changes to yellow on one street, the red should remain constant on the other street until it changes directly to green.

"Your committee feels that the yellow light is necessary for the safety of pedestrians and for the clearing of intersections where the addition of traffic police is not practical, and suggests that a possible traffic cycle providing for a sequence of green-yellow-red-green might solve the problem. Your committee wishes to say, however, that this conclusion is simply an opinion of the individual members and is not based on any scientifically determined facts. It is recommended, therefore, that a special committee, which should be equipped to carry on the necessary research, be appointed."

Tibbetts Brook Park, Westchester County, N. Y.

The First Completed Large-Scale Recreational Development of the Westchester County Park Commission

By Jay Downer

Chief Engineer, Westchester County Park Commission, Bronxville, N. Y.

PARK PLANNING PAYS

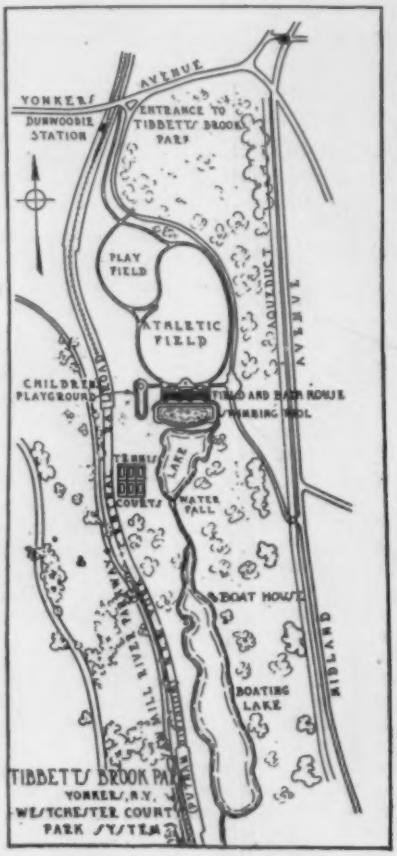
By prompt action the Westchester County Park Commission has saved for the public welfare the fine natural advantages of the Tibbetts Brook Valley, making use of them in an ideal combination of field and water sports. The people now have the enjoyment of the first available large recreational undertaking in the Commission's active program of park and parkway development—a program that is proving itself economically justified.

Vision and courage, broad-gage planning and rapidity of execution have been supported by the appropriation of $39,232,000 by the County Board of Supervisors—$28,707,000 for land acquisition, and $10,525,000 for construction and improvement. The influence of this park and parkway program is apparent in the gain in the county's total assessed valuations, from $788,029,096 at the beginning of 1924 to $1,143,871,106 in 1926—an increase of $355,842,010 as against a total increase of $132,800,138 for the year 1921-1923. Land values all along the parkway routes have grown, and lands in disuse have found a market.

An article in the May, 1925, issue of The American City, by Mr. Downer, on "County Park Development and Regional Planning," showed the importance of large-scale planning for future growth in any given region, and presented the basic elements of the Commission's plan—the development of suitably located park areas adapted to recreational purposes, and making these areas accessible from all parts of the county by a network of parkways or boulevards.

TIBBETTS BROOK PARK, at Yonkers, N. Y., the first large recreational development to be completed by the Westchester County Park Commission, was opened with appropriate dedication exercises on June 25, 1927. This park is one of the first projects laid out under Westchester County's forty-million-dollar park program, on which active operations started in 1923.

The recreational development of Tibbetts Brook Park, resulting from carefully studied design and construction, embodies the most advanced types of various recreational features in a well-planned relationship for convenient public use of the various facilities. The park, which is conveniently placed for the people of Yonkers and the adjoining closely populated communities, is located in a deep, picturesque, wooded valley,



which, fortunately, at the inception of active work on the County park program of 1923 was practically undeveloped.

The Tibbetts Brook valley extends north and south, and near its upper end, on comparatively high ground, is crossed by Yonkers Avenue. From this point a magnificent view stretches southward between the heavily wooded valley slopes toward Van Cortlandt Park in New York City. The long north-and-south center line of the valley was the natural course of Tibbetts Brook and was chosen as the main axis of the landscape development plan for the park. Upon this main north-and-south axis are located the principal recreational features of the park development. Proceeding from north to south, these features include the 13-acre athletic field and smaller play field, a large bath and

THE OLD SWIMMING HOLE IN TIBBETTS BROOK VALLEY, IN USE IN 1926

At right of center note sign warning against polluted water. Contrast with new swimming pool

erly slope of Nepperhan Heights, and the other near Bryn Mawr station. At the inception of the county park program, the westerly branch of the brook was nearly obliterated by a city refuse and garbage dump. Its badly polluted waters flowed under Yonkers Avenue and, at the point of its confluence with the easterly branch farther down the valley, Peckham's Lake had been formed by the construction of an earthen dam. Although used for bathing purposes, particularly by children, its waters were badly polluted, especially in periods of dry weather when the natural flow of the brook was greatly reduced. The slimy bottom of Peckham's Lake is now buried several feet below the sodded surface of the athletic field in the new park development.

SWIMMING POOL AND BATH-HOUSE, TIBBETTS BROOK PARK, WESTCHESTER COUNTY, N. Y.

field house, one of the largest concrete swimming pools in the country, and a children's playground and wading pool.

South of the swimming pool there is a small lake fed by the waters of Tibbetts Brook. At a lower level in the natural basin of the valley, an area formerly occupied by a cattail swamp has been converted into a boating lake about a half-mile long. This lake is enclosed by an irregular naturalistic wooded shore line with an outlet for the brook flow through a boulder-strewn spillway. These open land and water recreational spaces along the floor of the valley are flanked on either side by wooded, shady slopes for picnickers or those who prefer the quiet enjoyment of picturesque natural woodland.

Tibbetts Brook has its source in two small branches, one of which originates on the south-

CHILDREN'S PLAYGROUND AND SWIMMING POOL, TIBBETTS BROOK PARK

A Polluted Bathing Place Eliminated

The polluted condition of the brook and the inadequacy of its flow during dry seasons led

to the construction of an outdoor concrete swimming pool of the most advanced type. This pool, which is 429 feet long by 136 feet wide, will accommodate 3,000 people at one time and is supplied with pure city water kept in continual circulation from the pool through filters and sterilization apparatus. It is graded in depth from 1 foot to 10 feet and at the deep end is equipped with springboards and diving towers.

All of the recreational features and areas are entirely separated from the route of the Saw Mill River Parkway, which will form a connection between Van Cortlandt Park at the southerly boundary of Westchester County and the completed parkway section over Nepperhan Heights, which now ends at Rumsey Road and Spruce Street adjoining Tibbetts Brook Park. The main entrance to Tibbetts Brook Park will be from the Cross County Parkway, which will extend eastward from Rumsey Road on a route south of the present location of Yonkers Avenue.

The whole development has been accomplished at very moderate cost, largely because the park area was undeveloped and the land, principally held in one large ownership, was obtained at a low price.

The area devoted to recreational purposes includes about 153 acres. New York City's old and new Croton Aqueducts extend along the northerly and easterly boundaries of the park, augmenting the park lands with about 19 acres, making a total of 172 acres. The Park Commission purchased the 153 acres at a cost of about $208,000. The development work, including the excavation of lakes, dams, grading work, swimming pool, filtering apparatus, bath-house, paved access driveway, bandstand and children's wading pool and playground, cost about $900,000. An additional recreational area, which includes baseball diamonds, tennis courts and a running-track, is still under construction. When the entire park is fully completed and equipped, its total cost will not exceed $1,200,000. It is generally conceded by park authorities in the vicinity of New York City that the Tibbetts Brook development represents very large value for this outlay.

EDITORIAL NOTE.—The Westchester County Park Commission is composed of V. Everit Macy, President; Arthur W. Lawrence, John G. Agar, Cornelius A. Pugsley, Mrs. William A. Read and William J. Wallin.

The Tibbetts Brook Park development was carried out under the general direction of Jay Downer, Chief Engineer; L. G. Holleran, Deputy Chief Engineer, and Gilmore D. Clarke, Landscape Architect. The Kring-Becker Engineering Co. acted as consulting engineers on the design and construction of the swimming pool, and O. J. Gette of Yonkers was associate architect of the bath-house.

Slum Eradication by Excess Condemnation

IF the voters of Greater New York at the November election adopt a charter amendment just approved by the Municipal Assembly, the city of New York will enter upon a very interesting housing experiment.

The proposal is based on the power of excess condemnation already possessed by the city, under sections 970-a and 970-b of the City Charter, passed in 1916 in conformity with a constitutional amendment adopted in 1913. This amendment (Article I, Section 7 of the Constitution of New York State) provides that:

"The Legislature may authorize cities to take more land and property than is needed for actual construction in the laying out, widening, extending or re-locating parks, public places, highways or streets; provided, however, that the additional land and property so authorized to be taken shall be no more than sufficient to form suitable building sites abutting on such park, public place, highway or street. After so much of the land and property has been appropriated for such park, public place, highway or street as is needed therefor, the remainder may be sold or leased."

The use of the power of excess condemnation to help in solving the problem of decent housing for the poor of New York was urged some weeks ago by the Citizens Union. The proposal received the backing of Mayor Walker, who, shortly before starting on his European trip, suggested that blocks of slum property in the congested downtown sections of the city be secured by the excess condemnation method in connection with street widening projects, and that the land thus obtained be leased by the city for ninety-nine years at a rental of 4 per cent of the land value, to corporations which agree in return to erect apartment buildings of proper design and to rent space in them at not more than $8 a month a room.

The proposed supplement to the Greater New York Charter, just approved by the Municipal Assembly, reads as follows:

"Section 970-c. Lease for housing purposes of additional real property acquired in excess condemnation proceedings.

"Whenever additional real property is acquired by the city in excess condemnation proceedings pursuant to the provisions of Section 970-a, such additional real property may be leased by the city, acting through the Board of Commissioners of the Sinking Fund, for housing purposes (including stores on the street level) for such term as the Board of Estimate and Apportionment may determine; and the provisions of Section 205, or of any other section, limiting the term of leases by the city to a different period, and requiring appraisal shall not apply to such a lease for such purposes."

The Municipal Assembly had previously enacted, and Mayor Walker had signed on June 23, a tax exemption ordinance* under which housing corporations whose dividends are limited to 6 per cent, may secure local tax exemption for twenty years on multiple family houses, built to replace old-law tenements in congested districts. A group of philanthropists and capitalists, headed by August Heckscher, have given assurance of their willingness to undertake large-scale slum eradication projects under this ordinance, if the voters of New York City approve on November 8 the proposed amendment to the City Charter above quoted.

* This ordinance was adopted under the provisions of the housing law enacted by the 1926 Legislature—See "Slum Clearance Policy Adopted by New York State," in THE AMERICAN CITY for June, 1926, pages 620-622.

NIGHT FOOTBALL GAME AT GENERAL ELECTRIC ATHLETIC FIELD AT LYNN

Increasing the Usefulness of the Municipal Athletic Field

By F. W. Ralston

DURING recent years numerous attempts have been made to interest players and spectators in the illumination of recreation grounds, and of football fields in particular. Thousands whose daylight hours must be spent at work are able now to attend football, baseball and track events after dark, as a result of the work of illuminating engineers who have lighted athletic fields in different cities.

One such field is that of the General Electric Company, at Lynn, Mass., which has been available for night use for four years. In 1925 the arrangement of the field and the lighting was changed; five permanent towers were erected for the latter, each consisting of two 55-foot telegraph poles, set in the ground to a depth of eight feet. On these were built three platforms, each holding four large floodlight projectors. The lowest platform is 47 feet from the ground, the next 49 feet and the top one 53 feet.

The 12 floodlighting projectors on each tower are equipped with clear glass doors and 1500-watt, 110-volt lamps. Each unit projects about 14,400 beam lumens, or each tower a total of 172,800 beam lumens. In the five towers there are 60 projectors, giving a total of about 864,000 beam lumens and an average intensity of about eight foot-candles on the field. The amount of energy used by these towers is 90 kilowatts, with the addition of 4 kw. around the field for general illumination, lighting the grandstand, the driveway and the parking spaces.

In the case of soccer or football one unit in each tower is turned upward at an angle of 20 degrees in the air toward the center of the field, to form a canopy of light over the field. In the case of baseball the same arrangement is carried out, but it is necessary to project the light at a greater angle over the field (35 degrees), as the fly ball goes much higher than does a soccer ball or football.

As a result of the lighting of the athletic field at Lynn, information and experience were obtained that proved of great usefulness in lighting the Philadelphia municipal stadium. The stadium field, 840 feet long and 350 feet

TOWER WITH BANKS OF FLOOD-LIGHTING PROJECTORS, LYNN ATHLETIC FIELD

wide, is illuminated without glare to an intensity of at least seven lumens per square foot of horizontal surface to permit night playing of football, baseball and similar games. It is lighted by ten batteries of large floodlight projectors, each tower being equipped with eighteen 1500-watt, 110-volt Mazda C lamps in large projectors. The projectors are approximately 120 feet above the level of the field, one each at the northeast and northwest corners of the field and the other eight symmetrically placed at intervals along the stadium rim, 200 feet back from the playing field. There are also ten smaller floodlight projectors on top of the press stand at the south end of the stadium.

Five Acres of Recreational Space for Each Thousand Persons the Aim in England

A HIGH mark at which to aim has been set by the National Playing Fields Association, of London, in its recently published annual report. A page headed "The Association's Open Space Standard" reads as follows:

"After mature consideration of every need and difficulty, the Association has decided to urge all Local Authorities to aim at a minimum standard of five acres of public open space for every 1,000 persons, of which four acres should be set aside for team games (i. e., cricket, football, hockey, tennis, netball, bowls, etc.).

"An analysis of the recreational needs of the average population will show that four acres of playing fields is the barest minimum provision, if facilities are to be found for all who want to play.

"According to the 1921 Census, every 1,000 persons in England and Wales include 180 children under 10, and 320 adults over 40; so that 500—exactly half the population—are between the ages of 10 and 40, when active games are mostly played; 189 of these 500 are between 10 and 20 years old.

"Of the 500 persons between 10 and 40 years of age it may be assumed:

(I) That 150 (at the most) do not desire to play games or are prevented by physical infirmity from doing so;

(II) That 150 are attending schools or colleges which have playing fields of their own, or are members of private sports clubs, or employees of firms which provide recreation grounds for their own people.

This leaves 200 per 1,000 of the population who are neither too old nor too young to play games, who for financial or other reasons do not belong to any private sports club and who may therefore be assumed to be entirely dependent on the public pitches and courts provided by their Local Authority.

"In view of the fact that a football or hockey pitch requires at least 1¼ acres, that an acre will only provide five netball pitches or five tennis courts and that additional space is required for playgrounds for small children under 10, it will be found that at least four acres of playing pitches and playgrounds are required per 1,000 of the population.

"The Association therefore appeals to all Local Authorities and Town Planning Officers, when calculating the amount of public open space and playing fields required for their respective populations, to work to this minimum standard."

Government Encourages Orderly Arrangement of Rural Mail Receptacles

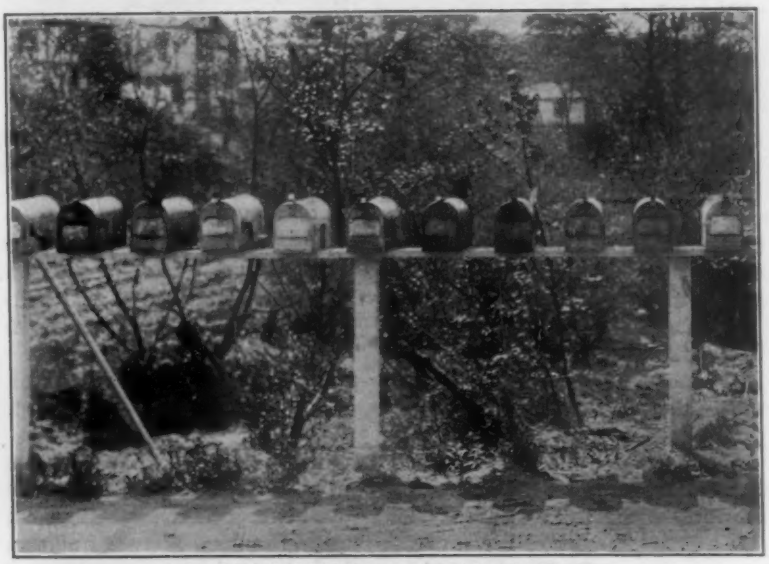
A CAMPAIGN which merits the hearty cooperation of highway departments and civic organizations in rural districts has recently been inaugurated by the Post Office Department under the leadership of H. H. Billany, Fouth Assistant Postmaster General. In keeping with the general movement toward abolishing billboards and unsightly roadside structures, this campaign aims to eliminate ugly mail-boxes from rural routes.

The Post Office Department has, of course, no jurisdiction over public roads, but wishes to cooperate as fully as possible, both directly and through its postmasters, with road officials and public-spirited organizations in conserving the natural beauty of the landscape as well as the safety of public highways. It is a requirement of the Department that rural mail-boxes shall be so located as to be readily accessible to the carriers without the necessity of their dismounting from their conveyances. It is another provision that boxes are permitted on the left-hand side of a route only on little-used roadways, and where no law or regulation will be violated by the carrier in serving boxes so placed.

A new circular recently sent to postmasters recommends the orderly grouping of boxes at crossroads and other locations where conditions are favorable. By photographic illustration the effectiveness of such grouping is shown, as contrasted with an untidy hodge-podge of posts, of uneven heights and sizes, leaning drunkenly against one another in their efforts to support the boxes which surmount them. It is suggested that a simple and practicable support for the grouped boxes (as shown in the illustration) might consist of a board placed shelf-wise on posts firmly planted and extending from 3½ to 4 feet above the ground. The Department, in the present campaign, reiterates the request made to patrons from time to time through local postmasters that all boxes and their supports be painted white, and that the paint be renewed at least once a year.

The boxes are the individual property of patrons, and it rests with patrons to keep them attractive in appearance. The Department will continue its past policy of suspending service where boxes fall into disrepair; and will continue its present efforts to the end that they be kept serviceable as well as attractive and an addition to the landscape, rather than a detriment.

RURAL MAIL BOXES AS THEY TOO OFTEN ARE



RURAL MAIL BOXES AS THEY MIGHT BE

Cooperation With the Post Office Department

in the proper naming, numbering and marking of streets and buildings in cities was recently urged in a special statement addressed to readers of THE AMERICAN CITY by Postmaster General New. The importance of good, continuous sidewalks, crosswalks and street lights was also stressed—see the May number, page 589. In a letter expressing his thanks for the publication of this article, the Postmaster General writes:

"Few people appreciate the fact that the distributors of mails in United States post offices do not know personally of the location of buildings that are unnumbered or individuals even of local prominence whose house address is not printed on their letterheads or mail. Omissions of this character cost the Department a tremendous sum of money and even with the best directory service we can provide frequently result in serious delays in delivery of mail for which the Department is unjustly criticised. Therefore, I say again I appreciate your printing the article."

Fire Prevention Inspections by City Firemen

From a Recent Bulletin of the Insurance Department of the Chamber of Commerce of the United States

EXPERIENCE has proven that one of the most important activities under the supervision of the busy, modern fire department chief executive is the operation of a well organized inspection system as a part of his fire prevention activities, and frequently the fire prevention committee of the local chamber of commerce can be of considerable assistance in establishing such a service where it does not now exist, or in improving the one already in operation.

That such work intelligently done is a sure method of reducing fire waste is indicated by an examination of the reports of those cities which have done such remarkable work as to win prizes in the Inter-Chamber Fire Waste Contest. In almost every instance the record of the prize winning cities places emphasis upon the work done by the firemen.

Direct Benefits

There are several direct benefits to be derived from regular inspections conducted by the Fire Department:

1. By the actual removal or correction of fire hazards many fires are prevented, which if they had occurred would have meant, in addition to the actual destruction of property, an unnecessary expense to the city for extinguishment, the jeopardy of the lives of both citizens and firemen and the possibility of a sweeping and disastrous conflagration. It is then a service of real conservation.

2. Such a system, properly conducted, has a valuable psychological and educational effect upon the owner or the occupant of the property inspected, in acquainting him with the fire hazards found, and with the needs and problems of the local fire department itself.

3. The local fire service becomes intimately familiar with the exact layout of every building inspected, as well as the peculiar hazards existing in each. This information, in the event of fire, naturally enables the fire fighters to handle the situation with the utmost efficiency instead of making blind guesses as to what to do, often resulting in death or serious injury.

In general, there are two methods by means of which this work is carried forward. The larger cities, as a rule, maintain a fire prevention bureau separate from the fire extinguishing force, while in the smaller communities the operations are conducted by the actual fire fighters—in many instances by the fire chief himself where there are no others available.

Fire Prevention Bureau

There is considerable difference in the working details of the various fire prevention bureaus conducted by fire departments in our metropolitan centers, and there probably is no one standard system which would be applicable to all cities. In order to arrive at some sort of idea as to how these fire prevention bureaus function, a questionnaire was recently sent to the chiefs of the fire departments of the following cities:

Baltimore
Boston
Chicago
Cincinnati
Columbus
Detroit
Denver
Grand Rapids
Indianapolis
Lincoln
Louisville
Memphis
Milwaukee
Omaha
Portland, Ore
Providence
Richmond
St. Joseph, Mo.
Seattle
Trenton
Tulsa
Wilmington

Of these 22 cities, 20 maintain a fire prevention bureau aside from the extinguishing force. In larger centers of population the very volume of the work necessary, the application of the local fire prevention code, the complexity of the peculiar hazards of many industries and other occupancies require the full time services of a group of men assigned to such work.

All except three have subordinate fire department officials as the chief officer of the bureau. Some of these titles are Fire Marshal, Battalion Chief, Chief Fire Prevention Engineer, Assistant Chief, Captain, and Manager. Naturally the chief officer of the fire prevention bureau should be well versed in the technique of fire prevention, not only as regards the many individual fire hazards themselves, and their proper safeguarding, but he should also be thoroughly familiar with the organization and operation of private fire brigades, all types of fire drills, exit facilities (including fire escapes), private fire alarm system, automatic

sprinkler installations and operation, and such matters. He should, of course, be an executive respected by his subordinates. He should also have sound judgment in his approach to the occasionally troublesome citizens, some of whom are successfully handled through diplomacy, while others require great firmness.

Fire Limits

Certain areas in most municipalities are known as the fire limits. These are fixed through ordinance of the local government and usually embrace territory where only certain types of construction or occupancy are permitted. The areas thus prescribed usually are provided with extra fire precautions, because of the customary presence of high values and congestion. There may be several such prescribed limits in one municipality.

Frequency of Inspection

As to the frequency of inspection *within the fire limits*, the above-mentioned questionnaire indicated that one bureau makes regular weekly inspections, three monthly, nine quarterly and three semi-annually. Six cities said that daily inspections were made, but this is understood to have meant that inspectors were daily at work rather than that each building received a daily inspection. Wherever possible to do so it is recommended that at least quarterly inspections be made within the fire limits, for the most serious consequences of an outbreak of fire are likely to occur here.

Four make daily inspections *outside the fire limits* (daily as defined in the preceding paragraph), one weekly, one monthly, two quarterly, six semi-annually, four annually, one "on call" and three do not make any. Considerable objection to the inspection of dwellings has arisen in some territory, not only from the occupants themselves, but also because of lack of men to perform this phase of the work; and in such cases it is recommended that the same end be attained by the use of home inspection blanks furnished to school children once or twice each year. Home inspections accomplished in this manner have produced remarkable results.

Rotation and Training of Inspectors

With two exceptions, inspectors are rotated from one district to another. This custom broadens the knowledge of the inspectors, and has a tendency to prevent oversights in too frequently inspecting the same building. Five inspect all classes, sixteen all except dwellings and one business houses only. Fifteen inspect and test sprinkler equipment, two inspect equipment, one inspects valves only and four do not inspect or test. Eighteen inspect standpipes and four do not.

Before being assigned to inspection work, firemen in all except three cities receive special schooling under trained inspectors or experienced firemen. As fire prevention is a science in itself, it is very important that inspectors be given a thorough training before attempting to do inspection work. The knowledge which the chief officer possesses as indicated above should be passed on to all of the inspectors. It is obvious that any but intelligent recommendations made by the bureau will only result in friction with local citizens. Just as in any other business, the inspector must be thoroughly familiar with his job.

FORM OF INSPECTION REPORT USED BY THE FIRE DEPARTMENT OF SPRINGFIELD, MASS. The original card measures 4 x 6 inches

FIRE DEPARTMENT **INSPECTION REPORT** SPRINGFIELD, MASSACHUSETTS

LOCATION OF PREMISES | DATE

NAME OF OCCUPANT | HOW OCCUPIED

NAME OF OWNER | ADDRESS

KIND OF BUILDING	√
FRAME	
BRICK	
STONE	
CONCRETE	
CONCRETE BLOCK	
IRON CLAD	
STEEL FRAME	
FIRE ESCAPES:—SAFE	
UNSAFE	
BLOCKED	
EXITS:—CLEAR	
BLOCKED	
WINDOWS:—CLEAR	
BLOCKED	

OIL BURNER STEAM ☐ HOT WATER ☐ HOT AIR ☐

NAME OF BURNER

PERMIT POSTED YES ☐ NO ☐ OIL LEAKS YES ☐ NO ☐

COMBUSTIBLES

KIND	√	HOW STORED	√
PAPER		BINS	
EXCELSIOR		WOOD BARRELS	
RAGS		METAL CANS	
OILY RAGS		METAL COVERS	
RUBBISH			

GASOLINE

QUANTITY _____ GALS.

IN SAFETY CANS YES ☐ NO ☐

WHERE FOUND

AUTOMATIC SPRINKLER

YES ☐ NO ☐

MAKE

WET ☐ DRY ☐

REPORT SUBMITTED BY

INSPECTOR.

Use reverse side for additional remarks.

F. P. D. Form A 28 11-25

The Coldwell dealer nearest you will gladly demonstrate Model "L" on your own grounds. Also send for descriptive literature.

First In Favor!

Coldwell Lawn Mowers stand first in the favor of park superintendents for these reasons:

DEPENDABILITY: Ruggedly built of finest materials, they stand hard usage without time-out for repairs.

EFFICIENCY: Exclusive engineering features insure a clean-cut job, and ease of operation.

ECONOMY: They cost less in the long run because of their thrifty operation and long, trouble-free service.

Coldwell Electric Lawn Mower. Plugs in on any electric outlet. All the operator has to do is to guide it. Just what you want for small plots and boulevard parkings. Send for booklet.

Descriptive literature on Coldwell Lawn Mowers sent on request. State model in which you are interested—hand, horse, electric or gasoline.

COLDWELL

***DEPENDABLE* LAWN MOWERS**

Hand *Horse* *Gasoline* *Electric*

COLDWELL LAWN MOWER CO., NEWBURGH, N. Y., U. S. A.

Do you mention THE AMERICAN CITY when writing? Please do.

In nine cities inspectors have police power and in one city they have restricted powers. In one case the Fire Marshal and the assistant only have police power, and in another instance the chief inspector and fire investigators have this power. In ten cases inspections are made by officers, in ten others by both officers and privates. In two cases no inspections are made. In eighteen instances inspections are made on city time and in three they are not. In one case they are made "on and off."

In all but six cities fire drills are conducted in city schools by firemen, the intervals varying from monthly to annually. Previous to attempting to supervise or criticize fire drills, the inspector should thoroughly acquaint himself with various types of drills, means of egress, and the dangers of each if improperly designed.

All except one city have a follow-up system. Re-inspections, mailed notices and check-ups by Fire Marshals are the usual custom. In some instances those who do not comply are referred to the State Fire Marshal's office. The card systems for keeping inspection records vary greatly, but almost all of the cities mentioned use such a method. Some are very elaborate with special printed blanks for use in connection with various occupancies. These blanks should be designed to meet local conditions.

A permanent fire prevention bureau can accomplish much, especially if backed up with an efficient modern building code, proper ordinances regarding fire hazards and authority for compelling corrections where resistance is met.

Inspections by Fire Extinguishing Force

It is sometimes difficult for moderate-sized cities to maintain a separate branch of the fire service for fire prevention exclusively and in extremely small cities this arrangement is very rare indeed. But every city having a fire department of any kind should see to it that regular inspections are made and that the inspector has authority to secure the elimination of existing fire hazards. Even where the fire chief is the only full time paid man on the department a reasonable portion of his time should be spent in doing this valuable work.

State Laws and Fire Department Inspection

That fire prevention inspections on the part of the fire department are important is further indicated by study of the existing Fire Marshal laws of some of our states. As four states have decreed by law that local fire departments do inspection work, a glance at certain sections of the laws in these is interesting.

In Indiana—"It shall be the duty of the chief of the fire department of each city of the first, second, third and fourth class, in addition to his other duties, to inspect all buildings, premises, and public thoroughfares, except the interiors of private dwellings, for the purpose of ascertaining and causing to be corrected any conditions liable to cause fire. Such inspection shall be made at least once in three months—in such fire limits."

A Section of the Kentucky Laws Reads—". . . the Chief of the fire department is required in person or by officers or members of his fire department designated by him for that purpose to inspect all buildings . . . except the interiors of private dwellings." The inspection is to be "made once each 6 months in territory served by the fire department, and not less than once in 3 months within the fire limits, and oftener as the Chief may order. A written report shall be made and kept on file."

In North Carolina—"It is the duty of the insurance commissioner to require in all municipalities of the state that such officers . . . make in their respective municipalities annual inspections of the buildings therein, and quarterly inspections of all premises within the fire limits, and report in detail the results of their inspections to the insurance commissioner upon blanks furnished by him."

The Wisconsin Law Says—"Such Chief of the fire department is required, by himself or by officers or members of his department designated by him for that purpose, to inspect all buildings, premises, and public thoroughfares, except interiors of dwellings, for the purpose of ascertaining and causing to be corrected any conditions liable to cause fire, or any violations of any law or ordinance relating to the fire hazards or to the prevention of fires." This is to be done not less than once in three months within the fire limits, and at least once in 6 months in all territory served by such fire department. Written reports must be kept on file "in the manner and form required by the Wisconsin Industrial Commission. Such inspection shall be subject to the supervision and direction of the Industrial Commission . . ."

In most of the other states the law is not so specific. In some the local chiefs "may inspect" (Illinois, Iowa, Vermont), or "shall inspect upon complaint" (Alabama). In Maine the municipal officers shall annually elect an "inspector of buildings," who at least once in three years shall "inspect chimneys, flues, funnels, stoves, furnaces, boilers and boiler connections and heating apparatus in all buildings within his jurisdiction." The Oklahoma law requires the fire chiefs to inspect certain buildings "which have and maintain fire escapes, at least every three months." Other states make local fire chiefs deputy state fire marshals with power to inspect. Thus it is seen that some state legislatures have appreciated the value of inspections by firemen.

A Suggested Ordinance

A suggested ordinance for establishing a bureau of fire prevention and defining proper powers and duties has been adopted by the National Board of Fire Underwriters and the National Fire Protection Association. Copies may be obtained upon request.

MUNICIPAL APPRAISAL SERVICE

The Manufacturers' Appraisal Company, in addition to its large industrial-plant appraisal business, serves Cities, Counties, States, Boards of Education and other governmental units requiring professional valuation services.

We are prepared to furnish competent specialists for any municipal requirement, and particularly for these services:

1. *Detailed or condensed appraisals* of buildings, machinery and furnishings of publicly owned institutions, such as city halls, police and fire stations, libraries, hospitals, schools and penal and charitable institutions. Such appraisals are used as a basis for determining insurance coverage; proof of fire loss; determining fair book values of publicly owned assets; checking against contractors' charges, etc.
2. *Tax assessment service* for revaluation of real estate for equalization of the tax burden. We have satisfactorily served about 75 American cities by assisting taxation officials in arriving at fair, equalized assessment valuations.
3. *Appraisal of public utility properties* for determination of fair service rates; also representation of municipalities in appeals of public utility corporations from local assessment valuations.

Inquiry at any of our offices will receive prompt attention. Write for free literature: (a) "Scientific Real Estate Aasessments by Somers System Methods," (b) prospectus of our book, "The Science and Practice of Urban Land Valuation."

Philadelphia (Executive Office)
Cleveland (Home Office)
District Offices:
New York
Chicago

The Manufacturers' Appraisal Company
Established 1899
WALTER W. POLLOCK, *President*

District Offices:
Detroit
Pittsburgh
St. Louis
Atlanta
Boston
Springfield, Mass.

Yes—we should like you to mention THE AMERICAN CITY.

Municipal Accounting and Finance

Conducted by Francis Oakey, C. P. A.

Member of the Firm of Searle, Oakey & Miller, New York

The Municipal Balance Sheet

A BALANCE sheet is a statement intended to reflect at a given date the approximate financial condition of a corporation, partnership or individual. For this purpose the balance sheet presents on one side the known, estimated, or appraised values of all assets or possessions, and on the other the amounts of all known liabilities, thus arriving at the excess of assets over liabilities or net worth. Thus the balance sheet is essentially a reflector of capital or net worth or net estate; it marks the progress in the acquisition of property; it is a measure of accumulated wealth.

By means of itemization and grouping of items the balance sheet conveys information relating to various phases of financial condition, namely:

1. Showing in one group all current assets and in an opposing group all current liabilities, it approximates current condition or the degree of ability to meet immediate obligations.

2. If there are any investments in stocks, bonds or mortgages not inherent in or essential to the conduct of the business and not readily marketable —these are shown in a separate group, thus indicating the extent to which capital has been thus diverted.

3. The plant or properties used in carrying on the business, such as lands, buildings, machinery, etc., are shown in a separate group at their estimated present worth; that is, cost less accumulated depreciation.

4. In order to arrive at the total net worth at a given date miscellaneous payments applicable to the operations of the next ensuing period, such as taxes, insurance and interest, are included as assets in a separate group.

5. Liabilities which are not immediate obligations, such as bonded debt or mortgages payable, are separately stated.

6. The owners' invested capital—the balancing figure— is shown as the last item on the liability side.

A balance sheet such as that outlined in the foregoing paragraphs is indispensable in nearly all important proceedings affecting the finances of a commercial business, for example:

1. Obtaining credit at the bank
2. Reorganization changes in capital structure, or the issuance of additional or new stock or bonds
3. Liquidation
4. Combinations or mergers
5. Sales of minority interests
6. Sales of plant or fixed property
7. Declarations of dividends
8. The determination of various questions relating to income taxes
9. The determination of various questions relating to local taxation
10. Valuations for insurance
11. The determination of the value of stockholders' equities
12. The determination of the return on invested capital

Commercial Balance Sheet Not Applicable to Municipal Finance

While the foregoing subjects are constantly considered in commercial affairs, they are quite foreign to the field of municipal finance, with the possible exception of the one first enumerated—obtaining credit at the bank. These subjects relate to the management of capital or property for gain.

A municipality has no capital or net worth; it is not created for the purpose of accumulating wealth; its chief resource—taxing power—cannot be valued. The values of its properties—its land and buildings, streets and sewers—have little or no relation to its financial condition—generally they cannot be sold or at least are not available for sale; nor are they available to pay debts or to mortgage as security for debt. Some of the most important properties of a city, such as its streets, sewers and riparian rights, cannot be appraised. When an attempt is made to place values on the permanent properties of a city and include them in a balance sheet, the result is a meaningless surplus. If, in addition, the funded debt which is generally the largest liability of a city, is included in its balance sheet, the effect is nothing more than the reduction of the already meaningless surplus produced by the inclusion of the permanent properties. Moreover, the inclusion of the funded debt may produce a

Installation of Republic Flow Meters at Elmhurst, Illinois

Do You Know What

ELECTRICAL OPERATION

Means in Water Meters?

The above photograph is typical in showing the convenience of electrical operation.

The meter body can be located in a tunnel, basement or some other inaccessible distant point and yet the reading instruments are close at hand where they can be read at a glance by the engineer.

In deciding on water meters you will agree that the following points are of utmost importance. They result directly from the use of the thin plate orifice and electrical operation.

(1) *Accuracy and convenience of reading* The panel board can be located at any place and its reading instruments wired to the meter body. Electrical operation eliminates error always associated with mechanical moving parts due to friction.

(2) *Ease and flexibility of installation* The use of the orifice plate makes installation a simple operation. All that is necessary is to insert the plate in some convenient flange.

(3) *Small differential required* The pressure drop does not actuate the reading instruments. They are actuated by an electric current. The meter is therefore extremely sensitive.

(4) *No voltage variation* Voltage variation in current supply does not affect the readings. This is a patented feature, developed exclusively for the Republic Flow Meter.

Bulletin "Republic Water Meters" sent on Request

Republic Flow Meters Co.

2226 Diversey Pkwy. **Chicago, Illinois**

deficit especially if the properties were acquired generations ago and have not been recently appraised.

Perhaps, the most important point remains to be made and that is that the financial condition of a city consists in its ability to finance service requirements and in nothing else. Its financial condition is not affected by the values of its properties, in dollars, but rather by their physical condition and capacity for service. It is true, its financial condition is affected by the amount of its funded debt, but this liability relates to the assets which cannot be valued—taxing power. The conclusion is that the form of balance sheet which has been long established in commercial affairs has no place in reporting the affairs of a municipality.

The Scope of the Municipal Balance Sheet

There is a statement of assets and liabilities which is essential in the management of municipal finances, namely, the current balance sheet which is confined to the presentation of current assets and current liabilities. This balance sheet includes the following items:

Assets:
- Cash
- Taxes accrued not collected
  - Less: reserve for deficiencies
- Miscellaneous accounts receivable
- Special assessments accrued not collected

Liabilities:
- Warrants payable
- Vouchers payable
- Temporary loans
- Assessment bonds or notes

Excess of Assets over Liabilities

In this statement only those liabilities are included which must be met in the current fiscal period immediately passing, and only those assets are included which are available or will be available to pay such liabilities. Stores or inventories of supplies and materials—items often treated as a current asset—are excluded because they are held by a municipality for sale only in rare instances and then in comparatively small quantities.

The Uses of the Current Balance Sheet

The current balance sheet is essential as a basis of action in disposing of various important questions which arise in the management of the finances of a city. Its chief use is to convey the information needed in the provision of cash to meet current obligations. In this question the relation of the cash balance to the current liabilities is the first consideration; the second is the rate of collection of receivables which may be expected. With these two points in mind decision may be reached as to the necessity or advisability of borrowing in anticipation of the collection of taxes. When compared with balance sheets of previous dates, the current balance sheet also is a basis for determining whether or not there is laxity or delay in the collection of taxes or other receivables. Thus it is a means of establishing administrative control over the efficiency of collecting offices.

Finally, the current balance sheet is an important statement in formulating the financial program, since it shows the current surplus available for appropriation after providing a reserve for outstanding contracts and orders.

(Copyright, 1927, Francis Oakey.)

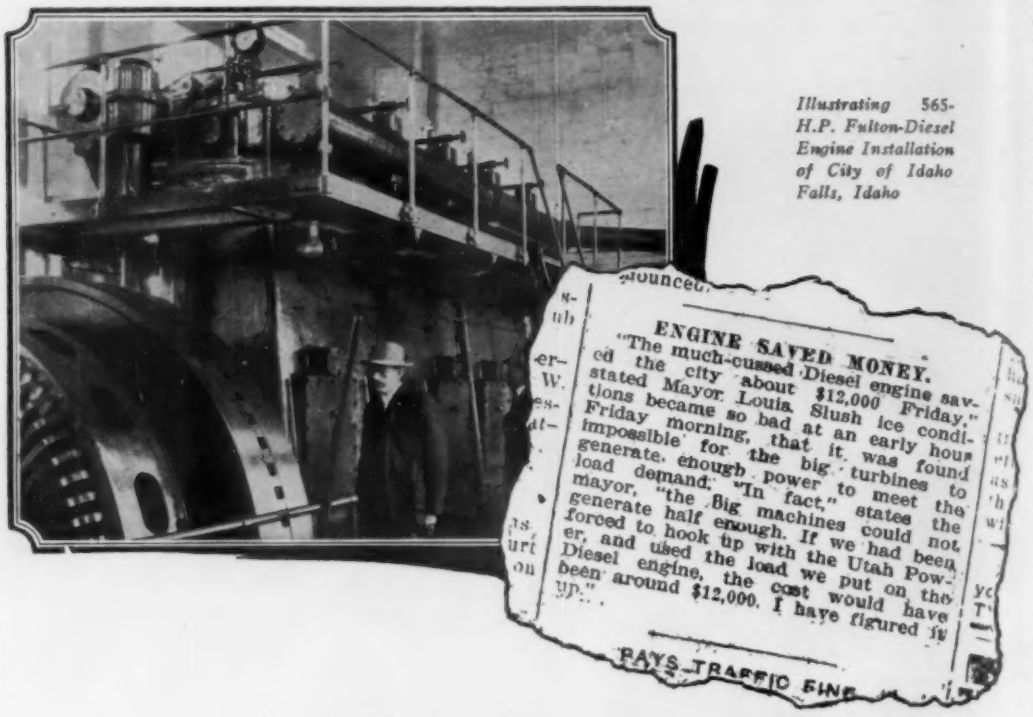
Department of Commerce Predicts 1000 Airports and Intermediate Landing Fields by End of 1927

A PREDICTION that by the end of 1927 about 1000 airports and intermediate landing fields will dot the United States from coast to coast and from the Canadian border to the Gulf of Mexico, is made in a statement issued July 18 by William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics. The statement is based on a survey of airway facilities by the Department of Commerce which shows that during the past year more than 50 new airports have been established and twice that number of cities have set aside funds or have begun plans for modern airports. Chambers of commerce, business clubs and other civic organizations are cooperating in the effort to build up a complete airway and airport system.

The present 864 fields include 207 municipal, 163 commercial and private airports, 124 Department of Commerce intermediate fields, 287 miscellaneous intermediate fields and 81 Army, Navy, and National Guard fields, 1 Treasury, and 1 Agriculture field. By the end of the 1928 fiscal year the Department of Commerce estimates that lighted and marked intermediate fields will total approximately 262 compared with 124 at the present time. In addition, 93 municipal fields are proposed. Besides these, the Department of Commerce has on record about 3,000 unimproved fields, such as pastures or similar areas throughout the country on which landings and take-offs have been or can be made.

A subsequent oral statement by Ernest Jones, Chief of the Aeronautics Branch of the Department of Commerce quoted in the *United States Daily* for August 17, reports that a total of 187 cities in the United States are now considering the establishment of municipal airports. The statement continues:

> "Though the establishment of adequate airports is an absolute necessity to the expansion of civil aeronautics, the task is essentially a municipal enterprise to be undertaken on the initiative of the individual city, Major Jones said. The formation of an airport committee through the local chamber of commerce is usually the first step taken. This committee communicates with the Aeronautics Division, Department of Commerce, which is particularly charged with the establishment of airports. The Federal Bureau cooperates, supplying all available information."



Illustrating 565-H.P. Fulton-Diesel Engine Installation of City of Idaho Falls, Idaho

ENGINE SAVED MONEY.

"The much-cussed Diesel engine saved the city about $12,000 Friday," stated Mayor Louis. Slush ice conditions became so bad at an early hour Friday morning, that it was found impossible for the big turbines to generate enough power to meet the load demand. "In fact," states the mayor, "the Big machines could not generate half enough. If we had been forced to hook up with the Utah Power, and used the load we put on the Diesel engine, the cost would have been around $12,000. I have figured it up."

PAYS TRAFFIC FINE

Another Instance of FULTON-DIESEL Economy!

In saving $12,000.00 for the city of Idaho Falls, Idaho, during a recent storm period, this 565-H.P. Fulton-Diesel Engine merely added another chapter to Fulton's long record of economical, dependable service. Mayor Ralph A. Louis' statement herewith reprinted from the January 4th, 1927, issue of the Idaho Falls Times-Register, tells the story.

FULTON IRON WORKS COMPANY, ST. LOUIS, U. S. A.

SUCCESSFUL ENGINE BUILDERS FOR OVER SEVENTY-FIVE YEARS

BRANCH OFFICES AND AGENTS

New York Dallas Jacksonville St. Paul Salt Lake City Havana

FULTON DIESEL

tion THE AMERICAN CITY—it helps.

The City's Legal Rights and Duties

Conducted by A. L. H. Street, Attorney at Law

Bridge Rails Need Not Be Automobile Proof

"While it is the duty of a municipality to use ordinary care in the construction and maintenance of highways, and to erect guard rails or barriers where their absence would leave the highway unsafe for ordinary travel, it is not an insurer against accidents, . . . and not bound to erect barriers of sufficient strength to withstand the shock of a carelessly driven automobile," said the Pennsylvania Supreme Court in the case of Yocum vs. Town of Bloomsburg, 137 Atlantic Reporter, 668.

Tax Levies Sufficiently Itemized—Clerk May Correct His Record of Meeting at Which Ordinance Was Passed

Delinquent taxpayers unsuccessfully attacked village tax levies in the case of People vs. Irvin, 156 North Eastern Reporter, 292, decided by the Illinois Supreme Court.

The tax levying ordinances each contained the same itemization, viz.:

"For salaries of village officials, $700; for street and alley improvements and maintenances, $1,000; for election expenses, $50; for printing and supplies, $50; total $1,800."

The court said:

"It is not necessary in these ordinances to give in detail each particular object for which the tax is to be expended. It is sufficient that the ordinances specify the object and purpose of the appropriation and the amount appropriated for such purpose. These ordinances are sufficiently specific to meet the requirements of the statute. . . .

"It is contended that the ordinances were not passed by the required number of votes. The clerk's record shows that five of the six members of the board of trustees were present, and that each of them voted for the passage of this ordinance. The clerk testified to the truth of this statement. While his record as originally made showed only three members voting, prior to the trial he amended it, in accordance with the rule in People vs. Hartquist, 315 Ill. 228, 146 N. E. 140, to make it conform to the facts."

City Is Not Liable for a Collision with a Safety Island If Due Care Was Used to Light the Place

A motorist drove into a safety island in a Jacksonville, Florida, street one dark morning, and sued the city for damages. Reversing a judgment in her favor, on the principal ground that the city was not at fault even if a nearby electric light was not burning, the Florida Supreme Court said in the case of City of Jacksonville vs. Bell, 112 Southern Reporter, 885:

"The use of such devices (safety islands) by municipalities in which heavy traffic is prevalent is to be commended, rather than condemned. Obstructions placed in public thoroughfares which are intended for the protection of the general traveling public do not constitute a nuisance and are not prohibited by the law. That law which is applicable to the right of maintenance of safety gates on railroad crossings . . . should be applied to the maintenance of such safety devices as are here under consideration. . . .

"If, as a matter of fact, the light was not burning at the time and if it had been the duty of the municipality to keep a light burning at and during all hours of darkness, it could not be held liable in this instance for actionable negligence upon the sole ground that the light was not burning because it is conclusively shown that if the light was not burning at the time, it had been burning immediately before the accident, and there had not sufficient time elapsed since the light had been seen burning by a city officer for the city to have been charged with notice of the unlighted condition. . . .

"Whether the light was burning or not could not affect the right of the defendant in this case to recover, because the undisputed evidence, in fact her own testimony, shows that she was familiar with the street and that she had full knowledge of the alleged obstruction and of its character. It has been repeatedly held that if one knows of an obstruction and knows that by the exercise of ordinary care he can avoid striking it while traveling along the street, his act in striking it is, per se, contributory negligence."

An Ordinance Requiring Snow to Be Removed By Owner or Occupant of Abutting Land Within a Stated Time—Held Valid

In the recent case of State vs. Small, 137 Atlantic Reporter, 398, the Maine Supreme Judicial Court sustained the validity of an ordinance of the city of Portland reading as follows:

"Section 1. The owner, tenant, occupant, or any person having the care of any building or lot of land bordering on any street, lane, court, square, or public place within the city, where there is any footway or sidewalk, shall after the ceasing to fall of any snow, if in the daytime, within three hours, and, if in the night-time before 10 o'clock of the forenoon succeeding, cause such snow to be removed from such footway or sidewalk."

For failure to comply, a penalty is provided of a fine of not less than two nor more than ten dollars, and an additional sum of not less than one or more than ten dollars for every hour the snow shall be permitted to remain on such footway or sidewalk beyond the limit fixed for its removal.

The Court said:

"Where there is a conflict among the authorities as to whether such municipal by-laws are valid, the weight of authority sustains them as a proper exercise of the police powers. . . .

"It is true that such burdens have some attributes in common with taxes for the general repair of streets, and the cases holding such by-laws invalid appear to be decided on the ground that the burdens thus imposed are not equally apportioned. . . .

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"The more generally accepted rule, however, treats such municipal by-laws as police regulations. . . . Even if viewed as a form of taxation, it must be of the nature of local assessments, which, by eminent authorities, are also held to be an exercise of the police powers; . . . or at least are not governed by the same constitutional limitations as taxes for general purposes. . . .

"The chief ground relied upon by the respondent is the shortness of time allowed for the removal of snow when it ceases to fall in the daytime. Three hours for such removal may work a hardship under some conditions, as in case of laborers or clerks living in suburban districts whose hours and place of employment take them some distance from home during the daytime, while ordinarily in the compact portions of a city it would not be unreasonable.

"The time limit for removal in by-laws of this nature, however, is a matter resting in the sound judgment of the legislative body of the municipality. The Court will not interfere simply because in its judgment a longer time should be allowed, unless the time fixed is so short that, on its face, or upon facts shown in evidence, it appears to be clearly unreasonable. As between three hours and four hours, or even five hours, which have been held reasonable limits . . . we cannot say, as a question of law, that the line between reasonableness and unreasonableness has been passed."

Appropriate Streets May Be Temporarily Assigned for Coasting Purposes and Closed to Vehicular Traffic

Under a proper statute or ordinance, the authorities of a municipality may set apart a street or highway, or part of one, for use in coasting or sled riding, holds the Court of Quarter Sessions for Beaver County, Pennsylvania, in the case of Commonwealth vs. Wagoner, 18 Municipal Law Reporter, Pennsylvania, 159. The opinion cites similar conclusions reached by the appellate courts of Indiana, Michigan, Connecticut, New Jersey and Pennsylvania. The court says, in part:

"When a street is being repaired it is generally closed by the street committee or the burgess and barriers are erected to prevent the use of said street during the time said repairs are being made. This power is also exercised where persons are seriously ill on the street and quiet must be maintained. It has also been exercised in order to prevent accidents which may be caused, and are caused, by coasting upon the streets in a borough. It is well known that when the streets in boroughs are in condition for sled riding thereon children, and even older people, will use them for coasting; and if vehicles are permitted to use the same streets, or cross the streets at the time they are being used for coasting, accidents are bound to happen. In order to avoid this difficulty it is a universal custom in this vicinity at least, and it evidently is in existence in other places, to close certain streets in the borough against vehicular traffic, and to compel the coasters to use only a certain street, or a certain part thereof. So that whenever the necessity arises, the burgess or the street committee have the power, and it may be their duty to close certain of the streets, or parts thereof, temporarily against vehicular traffic, and confine the coasting to said streets so as to avoid accidents."

Fire Limit Ordinance Held Void as Conflicting With the Alabama Code

Under the provision of the Alabama statutes, that a city or town council may prescribe fire limits within which buildings of inflammable material shall not be erected, an ordinance fixing "inner" and "outer" fire limits and permitting construction of dwelling-houses of inflammable material in the "outer" limits, is void, holds the Alabama Supreme Court in the case of Williamson vs. City of Anniston, 112 Southern Reporter, 109. The Court says:

"The controlling purpose of the ordinance is to create two distinct fire limits in which a different rule as to the character of material to be used in the construction of a certain class of buildings is prescribed, and its provisions are so interlinked with reference to the two that it is more than probable that it would not have been adopted so as to cover the outer fire limit without the proviso allowing the use of other than fireproof material in the construction of residences, and hence the whole ordinance must fall."

It seems that this decision is not necessarily inconsistent with the right of Alabama cities to enact a building code which, without reference to the fire limits, will require a greater degree of fire protection in the construction of multi-family buildings, business buildings, theaters, etc., than in single-family dwellings. The decision merely says that, under statutes permitting cities to prescribe fire limits and prohibiting erection of buildings of inflammable materials within such limits, a city cannot create an "outer" zone within the fire limits for the purpose of exempting dwelling-houses from the fireproof requirements of the ordinance.

City Cannot Authorize a Private Structure in a Street If It Impairs an Abutter's Air, Light and View

The city of Cleveland could not empower an owner of properties on opposite sides of a street to construct a connecting overhead bridge, if an objecting property owner's air, light and view would be thereby impaired, although the value of his property might be enhanced, declared the Ohio Court of Appeals in the case of Anthony Carlin Company vs. Halle Brothers Company, 155 North Eastern Reporter, 398. The court said:

"The dedication of this street embraced not only the surface of the ground but the light, air, and view above, and an individual would have no more right to obstruct the natural penetration of light and the free circulation of air above than to obstruct the surface of the street; and it is well settled that an individual cannot appropriate to his own exclusive use a portion of a street dedicated to the public use. Chicago Dock & Canal Company vs. Garrity, 115 Ill. 155, 3 North Eastern Reporter, 448. Nor could the city of Cleveland by any process of municipal legislation, or otherwise, grant any greater rights in Huron road than it possessed, which, as above stated, is only a fee in trust for public uses, that is for all uses as a street, subject always to the property rights in the street of abutting lot owners."

PRINTED MATTER FOR FIRE PREVENTION WEEK

A new Fire Prevention Week Supplement has been issued by the National Fire Protection Association in preparation for Fire Prevention Week, Oct. 9-15, 1927. This and other printed matter of value in the campaign against fire are obtainable from the Boston headquarters of the Association, 40 Central St.

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Pittsburgh City Council Votes for Congestion in the "Golden Triangle"

A PITTSBURGH architect has been asked by THE AMERICAN CITY to indicate whether there has been a clear conception in the public mind as to the intent and effect of contemplated changes in the Pittsburgh zoning ordinance which, as this issue goes to press, are reported to have been made by the Council of that city. Our informant states that he has set down an editorial comment from one of the newspapers of August 10th (while the amendment was resting in City Council), and, in contrast with this, has offered what he believes to be a more accurate and less misleading statement. He tells us he does not criticize an editorial writer for an occasional failure to seize upon the essence of a situation, but he believes the contrasting statement is the best answer he can give to our question.

The comparison is shown herewith, the paragraphs in quotation marks being the editorial quoted verbatim with [brackets] enclosing the phrases or statements which our correspondent believes to be incorrect or inadequate. In the rewritten editorial which follows, *italic* type has been used for the correct and adequate statements that would have given the people of Pittsburgh a more accurate knowledge of the scope and probable effect of the amendment.

The Editorial as Printed

"Councilmanic approval of an amendment to the zoning ordinance to permit the [erection of] tower super-structures on Grant Street is a recognition of the [topographical conditions which confront Pittsburgh capital and construction engineers in the building of large office buildings]. The present height limit of actual buildings is 265 feet. By the amendment towers [are permitted to rise above the 265 feet to twice the width of the widest street on which the buildings abut, going straight up on one side and then passing through a setting-back process on the others so that they will not cover the full area of the building proper].

"The attitude of council involves no invasion of the zoning plan of building for the remainder of the city. It is applicable solely to the downtown district. It is reasonable to believe that for years to come the business of Pittsburgh will be constricted within the Golden Triangle, and to meet this situation [some laxity is almost mandatory regarding height restrictions]. Land within this section is so costly that every foot of it [must be utilized to the last possible degree]. To follow any other course, to keep buildings closer to [the ground, would mean future increases in office rent, and a demand for space which could not be met]. Pittsburgh has not the opportunity to spread its business district that is possible in other cities which with great level spaces have room to throw out commercial picket lines.

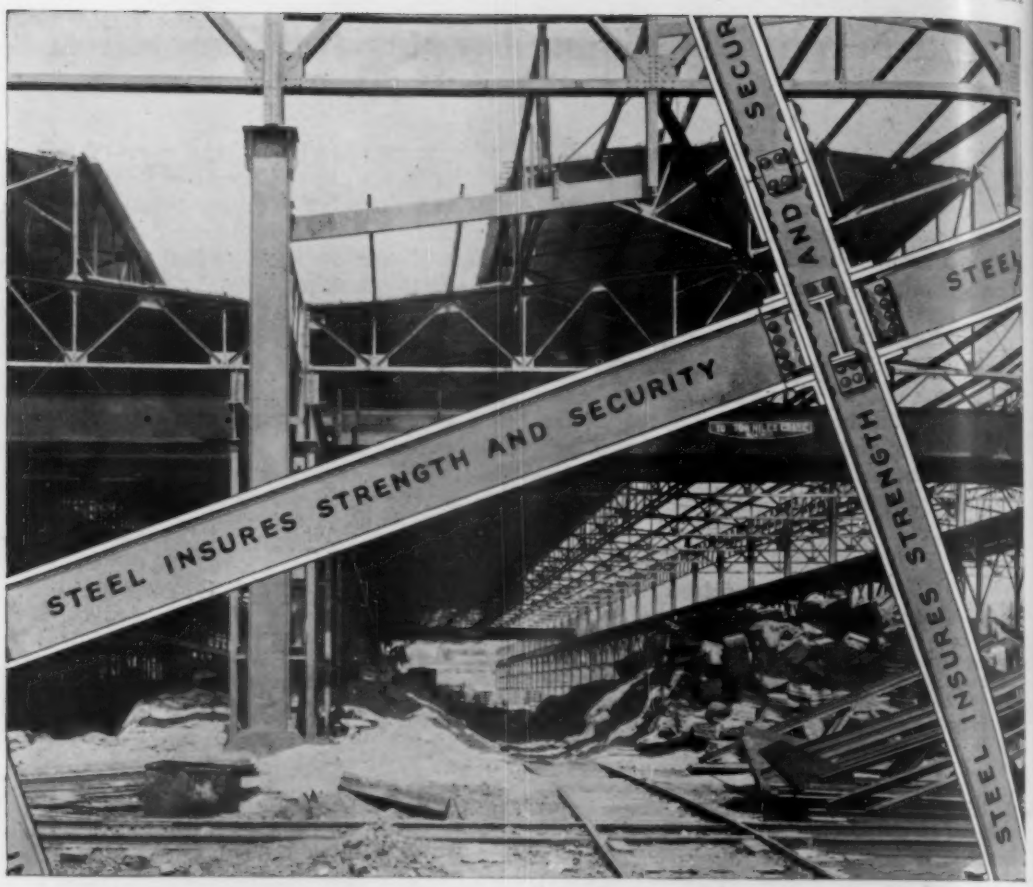
"With the setback system of tower building [there is no serious light obstruction on the street levels], one of the first considerations in the drawing up of a zoning ordinance."

The Editorial as It Might Have Read

Councilmanic approval of an amendment to the zoning ordinance to permit the *enlargement of now permissible* tower super-structures on Grant Street is a recognition of the *demand of property owners to be allowed to build structures as large as they individually think desirable without regard to any excessive burdens thereby placed upon the municipality.* The present height limit of actual buildings is 265 feet *plus an additional superposed tower portion whose height may equal twice the width of the widest street upon which the building abuts.* By the amendment *the face of* towers *need not be set inward from the lot lines so far as they are now required to do, this "setback" distance being lessened on three sides and entirely eliminated on the fourth; while the area occupied by the tower is no longer restricted so as not to exceed one-fourth the area of the site.*

The attitude of council involves no invasion of the zoning plan of building for the remainder of the city. It is applicable solely to the downtown district. It is reasonable to believe that for years to come the business of Pittsburgh will be constricted within the Golden Triangle, and to meet this situation *a most careful and even distribution of floor area throughout this district would appear to be the only practical solution.* Land within this section is so costly that every foot of it *should be assured the greatest possible opportunity to be developed without endangering a similar development of all other properties.* To follow any other course *than* to keep buildings closer to *that modest height limit to which all downtown structures might be reasonably expected to rise* would mean *that a few privileged structures would in advance corner all the space, anticipate most of the future requirements, and knock the so-called law of supply and demand into a cocked hat, while at the same time placing undue concentrations of burden upon public streets, transit and other utilities, and preventing adequate sunlight and ventilation from being assured to the adjoining streets and buildings.* Pittsburgh has not the opportunity to spread its business district that is possible in other cities which, with great level spaces, have room to throw out commercial picket lines.

With the setback system of tower building *pretty well shot to pieces by the proposed amendment, even less light and air will be assured than the present ordinance assures.* One of the first considerations in the drawing up of a zoning ordinance *having been originally provided for by the planning commission, the city council and the public have successively beaten down those safeguards, as, of course, they have a perfectly legal right to do.*



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Zoning Notes

Prepared by Frank B. Williams
Author of "The Law of City Planning and Zoning"
From data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Statutes and Ordinances

ORLANDO, FLA.—Ordinance, March 16, 1927.
EVANSTON, ILL.—Ordinance, February 15, 1927.
INDIANA.—Enabling Act for towns, 1927, ch. 3.
SCHENECTADY, N. Y.—Ordinance, June, 1927.
CHATTANOOGA, TENN.—Ordinance, January 25, 1927.

Recent Zoning Decisions

CONNECTICUT.—*Fitzgerald v. Merard Holding Co., Inc., Supreme Court of Errors, July 26, 1927.* A specially damaged property owner was held to have the right to compel enforcement of the zoning law regardless of whether or not the authorities are acquiescent in the violation. This decision is discussed at greater length by Edward M. Bassett at page 290 of this issue.

ILLINOIS.—*Village of Western Springs v. Bernhagan,* 156 N. E. Rep. 753. The defendant, seeking to place a filling station on a lot zoned for one-family residences, contended that the ordinance so restricting all the territory of the village except that small portion of it within a block of the railroad, was unreasonable. The village is a suburban residential community with no manufacturing institutions, its business district being limited to a small area along the railroad. *Held,* sustaining the determination of the Board of Appeals, that the ordinance is reasonable and valid.

ILLINOIS.—*Western Theological Seminary v. City of Evanston,* 156 N. E. Rep. 778. A zoning ordinance authorizing in a given district the erection and use of buildings for schools and colleges authorizes the erection and maintenance, as college buildings, of dormitories and student commons conducted as part thereof in such district; dormitories not being a "lodging-house" nor student commons, "boarding-houses," within the meaning of the ordinance.

MASSACHUSETTS.—*Nectow v. City of Cambridge, Supreme Court,* July 8, 1927. The plaintiff is the owner of land in a residential district bordering on an industrial district for the most part. He applied to the building inspector for a permit to erect a business structure on a part of his land, and his application was refused. He then applied to the Board of Appeals for a variance on the ground of unnecessary hardship, which the Board declined to give him.

Held, after a careful review of the facts, that the ordinance was valid as to the plaintiff, the Court being unable to find that the zoning was unreasonable. The cases showing that the fact that the land would produce a larger return if used for business are not decisive, cited and reviewed.

Missouri Supreme Court Upholds Zoning

Zoning is now constitutional in the state of Missouri. The case of *State ex rel. Oliver Cadillac Co. v. Christopher, Building Commissioner of the City of St. Louis* is another notable victory for comprehensive zoning reasonably carried out. Zoning with compensation had been held by the courts to be valid. In a case arising under the so-called home rule charter of St. Louis, police power zoning, without compensation, in certain of its important phases, had been declared to be invalid. The advocates of police power zoning, believing that the trouble with it in St. Louis was the lack of proper enabling legislation, secured the passage of an admirable empowering act (Laws 1925, p. 309) and the city enacted a comprehensive zoning ordinance under it. The Cadillac case followed. The Court cites many of the cases in favor of zoning, in the state and the United States Courts, decided since its ruling adverse to zoning under the home rule charter, and evidently was much influenced by them.

It is interesting to compare the situation in Missouri and in Maryland. In the largest city in both states police power zoning under home rule provisions was unsuccessful. In both states, as a result, constitutional amendment was advocated, but enabling acts were passed instead. This case is the result in Missouri. In Maryland the courts have not yet spoken.

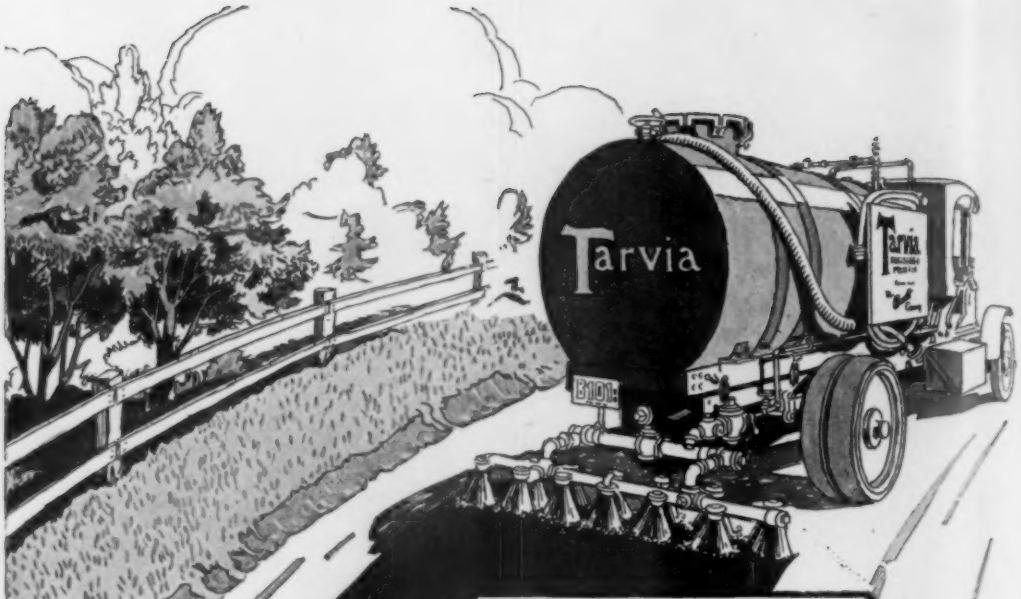
The Cadillac decision may be briefly summarized as follows: The company applied for a permit to erect a building for the sale and adjustment of automobiles, and the sale and installation of automobile parts and accessories in a multiple-dwelling residence district, to be created by a pending zoning ordinance, which was in fact passed ten days later. The permit was refused for this reason.

The Court held comprehensive police power zoning valid under the constitutions of Missouri and of the United States, ruling that the provision of the Missouri constitution requiring compensation for property *damaged,* as well as for property taken, did not make a different decision necessary in Missouri.

The Court also held that the fact that the ordinance was passed ten days subsequent to the application for a permit was immaterial in this case, the company having no vested rights against the exercise of the police power. The Court, after an examination of the facts, found that the zoning was reasonable and proper in this particular case.

"An Undertaking Establishment Is Not a Nuisance Per Se"

NEW YORK.—*Potter v. Rothschild, Supreme Court,* reported in the New York Law Journal, June 30, 1927. Action to restrain the defendant from using her premises in a business district as an undertaking establishment, in accordance with the zoning ordinance. Complaint dismissed. The



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opinion reviews the law on the subject as follows:

"Only one case in this state in which plaintiff sought to enjoin an undertaker's establishment has been brought to my attention. It is the case of *Rowland v. Miller*, 139 N. Y. 93, in which the injunction issued was based upon a restrictive covenant. Of course, there is no restrictive covenant involved here. There are a number of cases outside the state of New York in which the conduct of an undertaker's business was enjoined, but in all of these cases the defendants sought to locate their business in strictly or essentially residential districts. In none of them did defendant seek to establish himself in a district allocated by the city to business, as here. The law as laid down in these cases is stated in *Tureman v. Ketterlin* (304 Mo. 221, p. 228) as follows: 'An undertaking establishment is not a nuisance per se. The business of preparing dead bodies for burial is not only lawful but indispensable. It may become a nuisance, however, from the manner in which it is conducted or because of the place at which it is maintained, and it is very generally held to be such when it intrudes itself into a *strictly residential district*. *Beisel v. Crosby*, 178 N. W. (Neb.), 272; *Densmore v. Evergreen Camp*, 112 Pac. (Wash.), 255; *Saier v. Joy*, 198 Mich. 296; *Meagher v. Kessler*, 179 N. W. (Minn.), 732; *Osborn v. City of Shreveport*, 143 La. 932; *Goodrich v. Starett*, 184 Pac. (Wash.), 220; *Cunningham v. Miller*, 189 N. W. (Wis.), 531. The essential ground of such holding is that the maintenance of an undertaking establishment in a residence district tends to destroy the comfort, the well-being, and the property rights of the owners of homes therein.'"

Recent Zoning Literature

"The What and Why of the Proposed Cleveland Zoning Ordinance" is an excellent brief by the City Plan Commission, for the zoning of Cleveland, so long delayed and so greatly needed in that city.

Shortcomings in Assessment Methods, and Suggestions for Tax Equalization

THE Westchester County Research Bureau, of 31 Nassau Street, New York City, has recently issued a booklet which contains suggestions of value to county and local officials throughout the United States who are struggling with the problem of equalization of taxes. The Bureau's conclusions as to the shortcomings of the present assessment and equalization methods are summarized as follows:

1. "Full value" assessments are the exception rather than the rule.

2. There is a lack of equality in assessments between properties in the same town throughout the county. This is due primarily to the lack of property information necessary to make equal assessments, and to the absence of any scientific rules of valuation.

3. Approved rules for appraising land and standard building classifications are lacking in most of the towns and some of the cities of the county.

4. The work of assessing is usually carried on spasmodically by underpaid, part-time officials rather than as a full-time job whereby appraisal information might be collected continuously throughout the year.

5. Tax maps are not always kept up to date, and in some instances are missing.

6. The assessment of any property that runs through several towns, as railroads, and telephone lines, is generally done piecemeal by officials who, in many instances, have very little knowledge of the value of such property.

7. Party politics enter the work of assessments.

8. The review of assessments is carried on, in most towns, by the assessors themselves, who pass on their own work.

9. There is useless and absurd duplication of assessments brought about by the town assessing on one hand, and the villages assessing on the other, each at different values for the same properties.

10. A double set of equalizing rates now exists; one, made by the county board of equalization, and the other by the state board of equalization. Though the rates are supposed to be based on the same underlying data, they usually differ widely.

1. The work of county equalization amounts to a reapportionment, and re-allocation of assessed values rather than an equalization of assessed values.

RECOMMENDATIONS

As remedies for these conditions, the Bureau makes the following suggestions:

1. That effort should be centralized upon so amending the state constitution as to permit the establishment of the county as the unit of assessment, with a single county assessor upon whose valuations throughout the county would be based local municipal as well as county taxes.

2. That, in the meanwhile, it be urged upon all the towns of the county, to adopt the plan of a single assessor for the town, appointed by the town board.

3. That tax maps be brought up to date and means devised for enforcing their being kept always up to date and always accessible.

4. That land-value maps be adopted for each tax district, to be marked with front-foot values for all parcels, and that appropriate depth rules and corner or other influence rules be adopted for village or city property, farm valuation rules for outlying properties, and other appropriate principles of valuation be devised and adopted for other types of property, so that the assessor will have definite printed instructions as a means of defense against appeals for favoritism and partiality in assessment.

5. That standard classifications of buildings be prepared and adopted, and suitable rules for the valuation thereof, either by cubic-foot ratings or otherwise, be established and used impartially.

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The Municipal Bond Market

By Sanders Shanks, Jr.
Editor, *The Bond Buyer*

THE municipal bond market has survived the dullest summer in a number of years and is now in surprisingly strong condition when due consideration is given to the tremendous volume of new bonds which were thrown on the market during the six months ended June 30. The reactionary movement of prices which commenced in June and gave promise of being quite serious was quickly checked as the supply of new bonds dropped off sharply early in August. With the announcement of the reduction of the New York Federal Reserve Bank's rediscount rate to 3½ per cent, municipals showed great strength, prices recovering virtually half the losses suffered in the June break.

The outlook at this writing is for a widening demand in the fall and, at least, a maintenance of the current price level. The uncertain factor in the situation now is the problem presented by the maturity on November 15 of about $1,250,000,000 Second Liberty 4¼'s, remaining unconverted. The Treasury Department must either induce the holders thereof to exchange their bonds for a new security or sell new securities for cash in order to raise the funds necessary to redeem the Seconds. The fact that these holders of the called bonds have not responded to exchange offers made last March and again in June makes it fairly clear that they are interested only in cash redemption.

Information made public by the Treasury Department suggests that these bonds are held in widely-scattered small amounts and it is, therefore, assumed that a large proportion of this immense sum of a billion and a quarter dollars, when paid out to the bondholders, will not be reinvested in securities. The Treasury will, thus, have to call on the money market for large sums, issuing either short-term Treasury Certificates or bonds for the purpose. The extent to which this refinancing drains the market of funds which might otherwise be invested in municipal, railroad and other private securities and the character of the securities employed by the Treasury to raise new funds (i.e., whether short-term notes or long-term bonds) will have a most important bearing on the bond market during the next few months.

The following is a representative list of municipal issues sold in recent weeks, showing the net interest basis at which each loan was floated:

Place	Amount	Int. Rate (%)	Term (Yrs.)	Basis (%)
Norwich, Conn.	$225,009	4¼	22¾ (avg.)	4.06
Chester, Pa....	200,000	4¼	1-25 (serial)	4.11
Phila. Pa.....	15,000,000	4&4¼		4.13
Chicago, Ill., Sanitary Dist.	15,000,000	4¼	1-20 (serial)	4.16
Greenb'gh, N.Y.	370,000	4.20	10 1/3 (avg.)	4.18
Alleg'y Co., Md.	250,000	4¼	4-8 (serial)	4.20
St. Joseph, Mo.	736,000	4½	11 (avg.)	4.20
Lake Co., Ind.	470,000	4½	10 1/3 (avg.)	4.34
Monana Co., Ia.	300,000	4½	1-10 (serial)	4.34
Los Angeles Co., Cal.	1,400,000	5	24¾ (avg.)	4.36
Peoria, Ill.	150,000	5	15 5/6 (avg.)	4.42
Buncombe Co., N. C.	2,000,000	4¼	18 1/3 (avg.)	4.61
Brazoria Co., Tex., Brazos River Harbor Navig, Dist..	589,000	5½	17 (avg.)	5.30
Pan. City, Fla.	336,000	6	4-10 (serial)	6.82

Your Chances of Getting Killed by an Automobile

WHILE there has ben a steady annual increase from 1917 to 1926 in the number of fatalities caused by automobiles, and a steady increase in the number of cars in use, the number of fatalities per 100,00 cars has steadily decreased during the same period. Thus, in 1917, there were 9,097 fatal accidents and 5,104,321 cars registered, giving a fatality rate of 178.2 per 100,000 cars. In 1926, according to figures compiled by the American Automobile Association, the number of cars had increased to 22,001,393 and the number of fatalities had increased to 20,819, not including accidents at railroad grade crossings, which the United States Bureau of the Census charges to the railroads and not to automobiles. This gives a fatality rate of 94.63, or a decrease of 46.9 per cent.

But figures based upon car registration are somewhat misleading from an accident prevention standpoint, because they do not indicate the true hazard. Another basis must be used—population.

In 1917 the population of the United States, as estimated by the Bureau of the Census, was 102,172,845, which means that there were that many chances of somebody being hit by an automobile. In other words, that figure represents the exposure to accident. Thus we find that in that year the severity rate, which the United States Bureau of Labor Statistics is emphasizing in its accident records and which is generallv accepted by industry as constituting a true picture of the accident hazard, was 89.03 per million of population. That is, for every million people exposed to the possibility of automobile accident, 89.03 were actually killed in this manner. In 1926, the estimated population was 117,136,000 and the number of automobile fatalities was 20,819, giving an accident severity rate of 177.7, or an increase of 99.6 per cent over 1917.

So, while the number of cars is steadily increasing and the number of fatalities on the basis of registration is steadily decreasing, the number of fatalities on the basis of population is steadily increasing and the American people are in greater danger than ever before from this particular cause of accident.

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Municipal and Civic Publications

Prices do not include postage unless so stated

Problems in Municipal Government.—By A. Chester Hanford, Ph.D., Assistant Professor of Government, Harvard University. A. W. Shaw Co., Chicago and New York. 1926. XI + 457. $5.00.

Applying the case method to the study of municipal government and administration, Professor Hanford presents some 100 specific problems that have arisen recently in American cities, with concrete questions stated, to be answered by the student on the basis of the facts presented and the references given. These cases are intended to link up text-book principles to definite situations and develop other principles and ideas; to engender classroom discussion; and to provide correlative reading. The stimulation of original thinking is, of course, a central aim. Topics presented include city and state relations, charters, legal aspects, the various forms of city government, reform organizations, employment policies, city planning, zoning, recreation, public works, police, courts, fire prevention and control, public health and welfare, schools, housing, public utilities and finance.

Land Values—Distribution Within New York Region and Relation to Various Factors in Urban Growth.—Monograph No. 3, Engineering Series, of the Regional Plan of New York and Its Environs. It has been prepared by Harold M. Lewis, Executive Engineer, Wayne D. Heydecker, and Raymond D. O'Hara, and carries a foreword by Thomas Adams, General Director of Plans and Surveys, dated May, 1927. An introduction discusses land values in relation to the Regional Plan; Part I is on Distribution of Land Values, and Part II on Factors That Influence Land Values. There are 72 pages of text, and 4 plates; the text contains many diagrams, tables and maps. While necessarily in less detail than would be desirable in a single city-planning study, this monograph represents a fundamental and comprehensive study of great value in metropolitan regional planning and of general importance to others interested in city development. Two topics, the treatment of which is of particular interest, are the effect on land values of skyscraper development and the somewhat related phenomenon and factor of the existence of a large amount of vacant land (nearly 50 per cent even in Greater New York.) $2.00. (Apply to the Plan, 130 East 22d St., New York.)

The Book of Bridgeport, Connecticut.—A 51-page booklet published by the Bridgeport Chamber of Commerce, and constituting a hand-book of civic, industrial and commercial information about that city. The cover shows an airplane view of Bridgeport. (Apply to the Chamber, 991 Broad St., Bridgeport, Conn.)

Government Expenditures and Business Stability.—Four addresses or papers presented at the semi-annual meeting of the Academy of Political Science in the City of New York, covering 47 pp. in the *Proceedings* of the Academy for July, 1927. It is edited by Parker Thomas Moon. Expenditures of cities and states, as well as of the Federal government, were considered. The topic forms part of a series on "Stabilizing Business," presented in the same volume. $2.50. (Apply to the Academy, Fayerweather Hall, Columbia University, New York.)

Demonstrating Child Health, 1923-1927.—The Child Health Demonstration Committee, under date of June, 1927, issued Bulletin No. 4, having the above title and being concerned with the four demonstrations begun five years ago under the Commonwealth Fund. Three previous bulletins, dealing with these demonstrations, were briefly reported at p. 861 of THE AMERICAN CITY for June. 44 pp. (Apply to the Committee, 370 Seventh Ave., New York.)

A Survey of Public Health Work in Fargo, N. D.—Bulletin No. 5 of the Commonwealth Fund Child Health Program, dated June, 1927, reporting a survey of the whole range of public health work in Fargo, at the request of the City health authorities, by Dr. W. F. Walker, Field Secretary of the American Public Health Association. The survey was made in February, 1927, during the course of the five-year child health demonstration carried on in Fargo by the Child Health Demonstration Committee. 32 pp. (Apply to the Committee, 370 Seventh Ave., New York.)

City Health Administration.—By Carl E. McCombs, M.D., National Institute of Public Administration and New York Bureau of Municipal Research. The Macmillan Co., New York. 1927. X + 524 pp. $5.50.

Having been in close contact for fifteen years with state and local health administration, largely in the making of surveys, and having conducted courses in the subject at the Training School for Public Service, Dr. McCombs has produced a book to meet the need of a comprehensive but generally non-technical treatment of a field that has received meager attention in the general educational movement and even in post-graduate courses in government. It is clearly and simply written and is marked by strong common sense coupled with a high appreciation of public health service. There are three main divisions: Municipal Health Functions; The Organization and Administration of Sickness Preventive Functions, and of Sickness Treatment Functions. A selected bibliography is included. Chapter V, entitled The Health Officer, His Duties and Salary, is given in full in the current number of this magazine.

Paris s'étend . . . (Paris Spreads Out).—A 96-page booklet in French, by Georges Benoît-Lévy, Director, Town Planning and Garden City Association of France. It reviews various regional planning problems of Paris (and other cities) and proposals for their solution, and presents the author's views. He cites many American and English situations, theories and authorities, and particularly discusses the "linear city" and regional and national planning. $1.50. (Apply to the author, Boulevard de Garavan, Menton (A.-M.), France.)

Scientific Real Estate Assessments.—A pamphlet of 32 pages, published by The Manufacturers' Appraisal Co., presenting the merits of the Somers system, and methods of applying it. (Apply to the Company, 4021 Walnut Street, Philadelphia, Pa.)

Our Crippled Children.—This is the special topic of the June number of the *Bulletin of the City of Chicago Municipal Tuberculosis Sanitarium*, consisting of 24 pages. It describes the Spalding and Christopher Schools, Happy Haven Camp, and other phases of the work for crippled children. (Apply to the Sanitarium, 5601 North Crawford Street, Chicago, Ill.)

Personal Initiative and Civic Progress in Delaware.—The report to the annual meeting of the Service Citizens of Delaware, May 6, 1927, by Joseph H. Odell, Director, covering the activities of that organization, formed in 1918, and of the Delaware School Auxiliary Association. 33 pp. (Apply to Mr. Odell, 4116 DuPont Building, Wilmington, Del.)

Adult Education.—A selected bibliography on this subject, covering three printed pages, prepared by Frederick Warren Jenkins, Librarian, Russell Sage Foundation Library, and comprising Bulletin No. 83 of the Library. (Apply to the Library, 130 East 22nd Street, New York.)

The 1926 Movement of Manufacturing Industries.—A 7-page mimeographed report giving an analysis of replies received from 87 chambers of commerce, to a questionnaire sent out by the United States Chamber of Commerce, inquiring as to new establishments of industries in the cities involved, in 1926. Of 618 new industries, most were of local origin, one-seventh were removals from other cities, and somewhat more were branch plants. (Apply to Organization Service, Chamber of Commerce of the U. S., Washington, D. C.)

Measuring Oil in Underground Tanks and Tank Wagons.—Report No. 2284 of the New York State Bureau of Municipal Information, giving in two mimeographed pages suggestions from five cities in New York State, on the subject in question. (Apply to the Bureau, City Hall, Albany, N. Y.)

Heating and Ventilating School Buildings.—An article in the *American Educational Digest* for July, by H. W. Schmidt, consisting of three pages of discussion of the various systems. 35 cents. (Apply to the Educational Digest Co., 1126 Q Street, Lincoln, Neb.)

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American Citizenship.—By Frederick A. Cleveland, Ph.D., LL. D., Professor of United States Citizenship on the Maxwell Foundation, Boston University. The Ronald Press Co., New York, 1927. VII + 475 pp. $4.00.

The first of a series dealing with the general subject of citizenship, this book carries the phrase, "As Distinguished from Alien Status," as a limitation of the title. It aims to present the meaning and implications of American citizenship as defined in the constitutions of the Nation and the states, in statutes, the decisions of courts, and the utterances of government officials; it is thus a somewhat informal legal digest, topically and consecutively arranged, and rounded out with interpretive matter. There are three main parts, entitled: I—Citizens as Members of Political Society; II—Citizens and Aliens as Beneficiaries; and III—Citizens and Aliens as Subjects. The distinguished author recognizes a changing attitude of America toward the alien, with the increasing scarcity of land and increasing complication and conflict in the control of wealth. His book is a notable setting-forth of "the nature, importance and distinctiveness" of United States citizenship, as called for by the purposes of the Foundation with which his professorship is associated.

The Philosophy of Athletics.—By Elmer Berry, Associate Director of Physical Education, International Young Men's Christian Association College, Springfield, Mass. A. S. Barnes and Co., New York. 1927. XIV + 214 pp. $2.00.

This book is intended primarily for teachers of physical eduction and athletic coaching, and for the coaches themselves. On the thesis that physical education is an essential factor in general education, it presents the psychological basis of athletics, and its social, ethical, emotional and character-building values. Present ethical conditions in athletics are reviewed, and the question whether high ideals of sportsmanship can be maintained by athletic leaders is considered; the results of questonnaires submitted to the Y. M. C. A. College alumni, to football coaches (166 replying) and to Y. M. C. A. College students, are analyzed. Methods of securing ethical values from athletics are described and discussed. A concluding section of the book deals with the psychology of football and baseball coaching.

Extracts from Ordinances to Prevent Obstruction of Sidewalks by Merchandise.—Nine closely typewritten pages prepared by Frederick Rex, librarian of the Chicago Municipal Reference Library, made up of excerpts from ordinances of various cities having for their purpose the prevention of the use or obstruction of sidewalk space for the display and sale of produce and merchandise. Eighteen cities are represented. July, 1927. (Apply to the Library, 1005 City Hall, Chicago, Ill.)

The Water Debt.—A memorandum on the liquidation of the bonded debt of the Bureau of Water of Buffalo, N. Y., by the Buffalo Bureau of Municipal Research, Inc., dated June, 1927. Recommendations are made for overcoming sinking-fund inadequacy. 8 pp. text, 12 pp. tables. (Apply to the Bureau, White Building, Buffalo, N. Y.)

Trees.—Three booklets of The American Tree Association entitled, respectively, Common Trees of New York, by Joseph S. Illick; Tree Planting Book; and Forestry Legislative Survey. The first is a pocket manual, presented to the schools of New York by the Charles Lathrop Pack Forestry Trust; it has 123 pages. The second, 40 pages, gives directions for planting shade and forest trees, with a few Arbor Day exercises. The third presents a survey of state forestry laws and activities, to July, 1927 (67 pages). (Apply to the Association, 1214 Sixteenth St., N. W., Washington, D. C.)

Recreation for Blind Children.—Children's Bureau Publication No. 172, by Martha Travilla Speakman. A handbook intended for the use of teachers of the blind in institutions and day classes, and of other persons associated with the blind, such as club leaders and parents. Descriptions of many games are given. There is a three-page list of references. Single copies may be obtained free upon application to the Children's Bureau at Washington; additional copies may be obtained at 15 cents each from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Reapportionment in Illinois.—A symposium of arguments of various persons in favor of a fairer apportionment of representation in Illinois and a removal of the disadvantage now suffered by Chicago and Cook County. 23 pp. Postage 2 cents. (Apply to Illinois Apportionment Committee, 109 North Dearborn Street, or to Municipal Reference Library, 1005 City Hall, Chicago, Ill.)

Our City—Dallas.—By Justin F. Kimball, M.A., LL.D. Kessler Plan Association, Dallas, Texas. 1927. XXIX + 384 pp. Postpaid, fabrikoid $2.50, cloth $1.50.

Written by a man who as superintendent of schools, on the one hand, has experienced the need of such a textbook dealing with certain fundamental problems to be faced by tomorrow's citizenship in Dallas, and who as a city plan commissioner, on the other hand, has experienced the need for coverting the community to city planning ideals, this book represents a new departure in community civics. It is designed especially to be used in the seventh grade of the city schools of Dallas, but is expected to prove useful also to civic leaders, chamber of commerce committes and city planing commissions; and while based on conditions in Dallas it contains considerable material of general interest and application. A group of chapter headings will indicate the value of the work in educational campaigns for city planning elsewhere: "How Dallas Began"; "How Dallas Grew and Why"; "The Probable Growth of Dallas"; "The Streets of Dallas"; "American City Building"; "How Other Cities Have Been Planned"; "The Coming of George E. Kessler"; "The Kessler Plan, Then and Now." Subjects interrelated to city planning are considered under such heads as "Zoning and Housing," "Blighted Areas," and "Down Town Traffic." Some of the more general phases of local government are dealt with under such heads as "How American Cities Are Governed," "Municipal Functions," "County and City," etc., while a final chapter, "Helping Dallas," discusses some of the needs of the city and appeals to the civic idealism of the student in assisting to get them.

The Lighting of a Swimming Pool.—An article by Arthur J. Sweet, consulting engineer, Milwaukee, Wis., in the July *Transactions* of the Illuminating Engineering Society. Various considerations in the effective lighting of swimming pools are discussed. 8 pp. and illustrations. $1.00. (Apply to the publication, Easton, Pa.)

Nationality, Color, and Economic Opportunity in the City of Buffalo.—A 100-page booklet by Niles Carpenter, Ph.D., Professor of Sociology in the University of Buffalo, and associates, published under the direction of the Committee on Publications, on the Roswell Park Publication Fund of the University of Buffalo, in cooperation with The Inquiry, New York. The industrial and ethnic make-up of Buffalo is analyzed and the attitudes of employers and of trade unions to negroes and immigrants are gone into. A large number of individual cases were investigated. 50 cents. (Apply to The Inquiry, 129 East 52d St., New York.)

Statistical Report of Infant Mortality for 1926.—A printed booklet of 22 large pages, giving statistics on infant mortality in 675 cities of the United States for 1926 and the five preceding years, with averages back to 1916. It is prepared and published by the American Child Health Association, and is the eighth annual report of the latter upon this subject. There is a large folded insert showing graphically the 1926 infant mortality rate for each city. (Apply to the Association, 370 Seventh Ave., New York.)

Palos Verdes Estates.—An article by Frederick Law Olmsted, Jr., in the July number of *Landscape Architecture,* describing the history, planning, control and administration of the unique and exclusive residential development by the above name, near Los Angeles. There are many illustrations and maps, and a copy of the principal restrictions applying to the area. 25 pp. 75 cents. (Apply to *Landscape Architecture,* 9 Park Street, Boston, Mass.)

Architectural Control of Private Property.—Papers by Charles H. Cheney, city planner, and Elvon Musick, attorney, of Los Angeles, Calif., presented at the National Conference on City Planning (1927). Mr. Cheney, a digest of whose opinions and conclusions appeared at page 199 of THE AMERICAN CITY for August, discusses the lack of prevailingly good architecture in most of our cities and the progress being made in architectural control. Samples of a control ordinance and of a form of restriction of record, and a list of art juries, art commissions and architectural boards in the United States, are given in appendices. Mr. Musick discusses the legal authority for architectural control, private and public. 36 pp. 25 cents. (Apply to the Secretary, National Conference on City Planning, 130 East 22d Street, New York.)

Chicago Airports.—Chicago Commerce, published by the Chicago Association of Commerce, contains several articles in its July 2 number on aviation and airports, with particular reference to developments in Chicago, and that city's further possibilities. Airplane photographs of various Chicago airports and a map are included. 10 cents. (Apply to *Chicago Commerce,* 10 South LaSalle Street, Chicago, Ill.)

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The Haiss Snow Leader will handle snow under all conditions—it will load the worst snow, as well as hang up speed records in getting rid of a light, fluffy snowfall.

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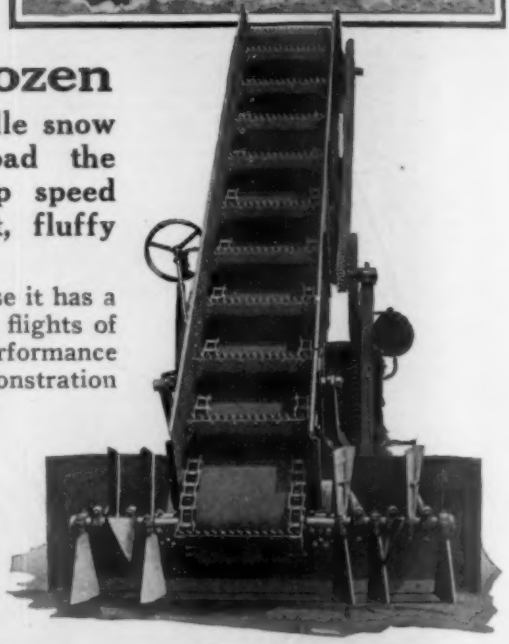

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The Activated Sludge Process.—By Arthur J. Martin, Consulting Engineer, Past President, Institution of Sanitary Engineers, England, M. Inst. C.E., M. Inst. Water Engrs., M. Cons. E., F.G.S., F.R. San. I. Macdonald and Evans, 8 John St., Bedford Row, W. C. 1, London, England, 1927. XIV + 415 pp. Tables and illustrations. 30 shillings, plus duty.

A most illuminating book on the outstanding method of sewage treatment today. The book covers both large and small plants in England and the United States, discussing freely mechanical agitation as well as the use of diffused air. A complete summary of the history of the activated sludge process is included as well as suggestions for the improvement of the process, costs, possible methods of reduction of costs, and chapters devoted to possible lines of advance and to the problem of sludge disposal. Several appendices are devoted to particulars of British plants using diffused air and of British plants using mechanical agitation as well as particulars of American plants. A very complete bibliography is included.

The Little Town.—By Harlan Paul Douglass, Secretary, American Missionary Association. The Macmillan Co., New York. New edition, 1927. IX + 262 pp. $2.00.

The first edition of this book appeared in 1919, as a pioneering study of the small town, for itself and in relationship to its surrounding country area, and to provide or suggest stimuli for democratic civic progress. It has now been revised to a limited extent, in the light of the 1920 census and the recent investigations of the American village by the Institute of Social and Religious Research. It is to be regretted that a more complete revision was not entered upon, bringing the entire book up to date—as a statement on the jacket would lead one to expect had been done—and keeping it as valuable in its field as when first published. The bibliography does not seem to have been added to at all.

Do Forests Prevent Floods?—An article by Raphael Zon, Director, Lake States Forest Experiment Station, reprinted from *American Forests and Forest Life*. Mr. Zon discusses the fundamental importance of reforestation and forest management in any scheme of floor control. 7 pp. (Apply to The American Forestry Association, Washington, D. C.)

An Improved Efficiency Rating System for Cincinnati.—Report No. 8 of the Cincinnati Bureau of Municipal Research dated May, 1927. There are 14 pages of text, supplemented by three sample forms and a table. The report is submitted to the City Manager and the Chairman of the Civil Service Commission of Cincinnati by John B. Blandford, Jr., Director of the Bureau; it deals with the defects of the present rating system, suggests a simpler and more reliable method, and points out the worth of an accurate system while warning against a tendency to over-value such ratings. (Apply to the Bureau, 312 W. 9th St., Cincinnati, Ohio.)

Aviation Edition, The Buffalo Journal of Commerce.—This is the July number of the monthly magazine of the Buffalo Chamber of Commerce, and is its fourth annual aviation edition. It contains several articles on the present and future status of aviation, both generally and with special reference to Buffalo. 15 cents. (Apply to *Journal of Commerce*, Chamber of Commerce Building, Buffalo, N. Y.)

Governmental Responsibility in the Field of Social and Welfare Work.—An address by Leyton E. Carter, Director of the Municipal Research Bureau of Cleveland, delivered at the 53d annual session of the National Conference of Social Work. It is reprinted in mimeograph form, particularly for distribution among municipal research agencies. Arguments are presented for increased responsibility for governments in the welfare field. 3 pp. (Apply to Municipal Administration Service, 261 Broadway, New York.)

Annual Report, Committee of Fourteen, New York City (1926).—This is the 1926 report of the committee organized in 1905 to secure the suppression of the disorderly resorts known as "Raines Law hotels," and the work of which was later extended to cover commercialized vice in general, throughout New York City. The current report is a 54-page booklet relating to the year's activities of the Committee and the status of the problem. (Apply to the Committee, 105 West 40th St., New York.)

The Schools of Tomorrow.—A 14-page pamphlet comprising an address by John J. Tigert, United States Commission of Education, before the National Education Association at Philadelphia, July, 1926. 5 cents. (Apply to Superintendent of Documents, Government Printing Office, Washington, D. C.)

Report on the Street Traffic Control Problem of San Francisco.—The San Francisco Traffic Survey Committee, appointed last year, engaged Dr. Miller McClintock, Director of the Albert Russel Erskine Bureau of Harvard University, to organize and conduct a comprehensive engineering survey. The present report of 370 pages is the result of about a year of intensive investigation. It presents the facts of street traffic conditions and sets forth recommendations for a system of street traffic control and proposals for administrative organization and methods to meet future problems. A proposed traffic ordinance is included. Details of traffic flow and traffic speed studies are given in an appendix. Business interests of San Francisco contributed to the support of the work. Buckram, $5.00, postpaid. (Apply to Mr. Ralph Robinson, Executive Secretary of the Committee, 426 Foxcroft Building, San Francisco, Calif.)

Venereal Disease Control.—The July, 1927, number of *Public Health News* of the Department of Health of the State of New Jersey, is taken up with a number of articles on this subject by members of the staffs of the State Department and various municipal departments. 31 pp. (Apply to State Department of Health, Trenton, N. J.)

Report to New York State Crime Commission.—Two pamphlets addressed to Senator Caleb H. Baumes, Chairman of the New York State Crime Commission, one (43 pp.) being by the Sub-Commission on Police, giving the results of the investigation into municipal police administration, with recommendations. The latter are given elsewhere in the current issue of THE AMERICAN CITY. The other (30 pp.) is by the Sub-Commission on Adjustment of Sentences, and contains findings and recommendations relating to probation. (Apply to Herbert L. Smith, Secretary, State Crime Commission, Senate Chamber, Albany, N. Y.)

Municipal and Public Golf Courses in the United States.—A 24-page pamphlet issued by the Public Links Section, United States Golf Association. 201 golf courses in 149 cities are listed as coming under the classification of "public." Statistical information as to separate courses is included. The list is not claimed to be complete. (Apply to the Association, 110 E. 42nd St., New York.)

Combating the Inroads of the White Plague.—The March and April number of *City Health*, of the Detroit Department of Health, takes up the activities of the tuberculosis division of the Department of Health, the tuberculosis infirmary, and related subjects, covering 24 pp. (Apply to the Department, 1300 Beaubien St., Detroit, Mich.)

Regional Planning.—A new periodical, issued by the Committee on Regional Planning of New York and its Environs. It is edited by Leslie S. Baker, Staff Secretary, and briefly presents news regarding regional planning, with special reference to the New York Plan. (Apply to Mr. Baker, 130 E. 22d St., New York.)

The Bacteriolytic Tank System in South Australia.—A 60-page booklet by Dr. W. Ramsay Smith, Permanent Head of the Department of Health of South Australia. It is the seventh edition, the earliest having appeared twenty years ago as a three-page print. It is based upon experiences for a quarter-century, with over 11,000 installations now in operation. Illustrated. (Apply to the author, Adelaide, South Australia.)

Boy-Built Houses.—A 36-page booklet describing a school project method of training boys for house building. It includes a study of 106 houses built by schoolboys, chiefly five- and six-room houses, with a few even larger. 10 cents. (Apply to Better Homes in America, 1653 Pennsylvania Avenue, Washington, D. C.)

Travelers' Aid Manual.—The history, purpose, and service of travelers' aid, and the organization and other features of the National Association of Travelers' Aid Societies are told in this 40-page pamphlet, which is the first section of the complete Manual. (Apply to the Association, 25 West 43rd Street, New York.)

Reports Received

CONCORD, N. H.—Annual Report, Board of Water Commissioners, 1926.

MONTCLAIR, N. J.—Annual Report, Department of Health, 1926.

MONTREAL, QUE.—Annual Reports of the City Treasurer and of the Comptroller and Auditor, 1926.

NEW CASTLE, PA.—Annual Report of Departments, 1926.

PRINCETON, N. J.—Annual Report of Auditor, to April 30, 1927.

Eliminates "Snowbound" Highways

EVERY Municipality, County and Township recognizes the necessity of keeping streets and highways open — free from impassable snow. Taxpayers demand it — the avenues of travel must be kept clean for children to get to school — communities to work — supplies to their destinations.

And the costs are not prohibitive. In fact, the Trackson-Fordson operates faster and cheaper than horses or heavier, more expensive tractors. This Crawler tractor can be used with any Fordson snow plow. Start with the storm and keep the roads open, avoiding serious and costly drifts and banks.

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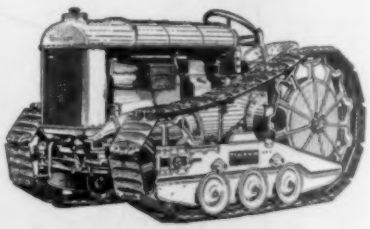

No other crawler has a combination of these advantages: All-steel construction — no cast iron parts; Fewest working parts — lowest upkeep cost; Patented non-clogging track of specially hardened alloy steel; Greater track area — better traction — less ground pressure; Oil reservoir type dirt-proof bearings; Simple steering — no complicated clutches.

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Conventions—When and Where

SEPTEMBER 5-6.—MADISON, S. D.
Tri-State Peace Officers' Association. Convention. Secretary-Treasurer, A. J. Lembeck, Aberdeen, S. D.

SEPTEMBER, SECOND WEEK.—HURON, S. DAK.
South Dakota Commercial Secretaries Association. Annual convention. Secretary, G. R. McArthur, Chamber of Commerce, Huron, S. Dak.

SEPTEMBER 13-15.—PEORIA, ILL.
Illinois State Association of Highway Commissioners and Town Clerks. Annual convention. President, John Harms, Auburn, Ill.

SEPTEMBER 13-15.—DUBUQUE, IOWA.
International City Managers' Association. Annual convention. Executive Secretary, John G. Stutz, Lawrence, Kans.

SEPTEMBER 13-16.—BUFFALO, N. Y.
Assembly of Civil Service Commissions. Annual meeting. Secretary, Charles S. Shaughnessy, Chief Examiner, Philadelphia City Commission, Philadelphia, Pa.

SEPTEMBER 13-16.—BOSTON, MASS.
New England Water Works Association. Annual convention. Secretary, Frank J. Gifford, 715 Tremont Temple, Boston, Mass.

SEPTEMBER 15-16.—AKRON, OHIO.
American Water Works Association, Central States Section. Annual convention. Secretary, E. E. Bankson, 1111 Union Bank Building, Pittsburgh, Pa.

SEPTEMBER 16-17.—GAFFNEY, S. C.
South Carolina Commercial Secretaries Association. Annual meeting. Secretary-Treasurer, R. B. Beal, Chamber of Commerce, Spartanburg, S. C.

SEPTEMBER 19-23.—SACRAMENTO, CALIF.
League of California Municipalities. Convention. Executive Secretary, Wm. J. Locke, 564 Market Street, San Francisco, Calif.

SEPTEMBER 20-21.—SWAMPSCOTT, MASS.
Massachusetts Police Association. Annual convention. Secretary, John H. Shaughnessy, West Newton, Mass.

SEPTEMBER 26-29.—PHILADELPHIA, PA.
American Institute of Park Executives. Annual convention. Executive Secretary, Will O. Doolittle, Box 422, Tulsa, Okla.

SEPTEMBER 26-30.—CHICAGO, ILL.
National Safety Council. Annual Safety Congress. Managing Director, W. H. Cameron, 108 East Ohio Street, Chicago, Ill.

SEPTEMBER 27-29.—NIAGARA FALLS, ONT.
Canadian Good Roads Association. Annual convention. Secretary, George A. McNamee, New Birks Building, Montreal, Que.

SEPTEMBER 28-30.—SARATOGA SPRINGS, N. Y.
New York State Sanitary Officers' Association. Annual meeting. Secretary, Walter A. Leonard, M.D., Cambridge, N. Y.

SEPTEMBER 29-30.—ELMIRA, N. Y.
American Water Works Association, New York Section. Annual meeting. Secretary, E. D. Case, 50 Church Street, New York.

SEPTEMBER 29-OCT. 1.—HARRISBURG, PA.
Pennsylvania State Association of County Commissioners. Annual convention. Secretary, L. C. Norris, Clearfield, Pa.

OCTOBER 3.—DENVER, COLO.
American Association of State Highway Officials. Annual convention. Executive Secretary, W. C. Markham, 638 Munsey Building, Washington, D. C.

OCTOBER 1-7.—CLEVELAND, OHIO.
American Electric Railway Association. Annual convention and Manufacturers' Exhibit. Executive Secretary, J. W. Welsh, 292 Madison Avenue, New York.

OCTOBER 3-7.—MEMPHIS, TENN.
Playground and Recreation Association of America. Annual convention. Secretary, H. S. Braucher, 315 Fourth Avenue, New York.

OCTOBER 4-5.—GREENFIELD, MASS.
Massachusetts Federation of Planning Boards. Annual conference. Executive Secretary, Edward T. Hartman, 37 State House, Boston, Mass.

OCTOBER 5-8.—SAN JOSE, CALIF.
American Water Works Association, California Section. Annual convention. Secretary, Paul E. Magerstadt, 512-16th Street, Oakland, Calif.

OCTOBER 10-12.—KANSAS CITY, MO.
American Social Hygiene Association. Annual regional conference. General Director, William F. Snow, M.D., 370 Seventh Avenue, New York.

OCTOBER 10-12.—HOT SPRINGS, ARK.
Southwest Water Works Association. Convention. Secretary, Louis A. Quigley, Fort Worth, Texas.

OCTOBER 10-14.—CHICAGO, ILL.
Illuminating Engineering Society. Annual convention. General Secretary, L. H. Graves, 29 West 39th Street, New York.

OCTOBER 12-13.—RACINE, WISC.
Wisconsin Chiefs of Police Association. Annual meeting. Secretary-Treasurer, Don McKay, Police Department, Waukesha, Wisc.

OCTOBER 12-14.—COLUMBUS, OHIO.
American Society of Civil Engineers. Fall meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

OCTOBER 12-14.—JUNCTION CITY, KANS.
League of Kansas Municipalities. Annual convention. Secretary, John G. Stutz, University of Kansas, Lawrence, Kans.

OCTOBER 13-14.—TORONTO, ONT.
Canadian Tax Conference of Citizens Research Institute of Canada. Annual convention. Director, Horace L. Brittain, 21 King Street, East, Toronto, Ont.

OCTOBER 17-21.—CINCINNATI, OHIO.
American Public Health Association. Annual meeting. Secretary, Homer N. Calver, 370 Seventh Avenue, New York.

OCTOBER 23-26.—COLUMBUS, OHIO.
National Association of Commercial Organization Secretaries. Annual convention. Secretary-Treasurer, Clarence R. Miles, Chamber of Commerce, Davenport, Iowa.

OCTOBER 26-29.—PINEHURST, N. C.
American Institute of Steel Construction. Annual convention. Executive Director, Charles F. Abbott, 285 Madison Avenue, New York.

NOVEMBER 1-4.—HOUSTON, TEXAS.
Texas Association of Sanatarians. Short School. Secretary, E. G. Eggert, Texas State Board of Health, Austin, Texas.

NOVEMBER 7-9.—DURHAM, N. C.
American Water Works Association, North Carolina Section. Annual meeting. Secretary-Treasurer, H. G. Baity, Associate Professor, School of Engineering, University of North Carolina, Chapel Hill, N. C.

NOVEMBER 9-11.—NEW YORK.
National Municipal League. Annual convention. Secretary, H. W. Dodds, 261 Broadway, New York.

NOVEMBER 10-11.—NEW YORK.
National Association of Civic Secretaries. Annual meeting. Secretary, Henry H. Curran, City Club, 55 West 44th Street, New York.

NOVEMBER 10-11.—KITCHENER, ONT.
Ontario Associated Boards of Trade and Chambers of Commerce. Annual meeting. Secretary, T. Marshall, Royal Bank Building, Toronto, Ont.

NOVEMBER 14-18.—DALLAS, TEXAS.
American Society for Municipal Improvements. Annual convention. Address: E. A. Wood, City Engineer, Dallas, Texas.

NOVEMBER, WEEK OF 28TH.—ATLANTA, GA.
Asphalt Association. Annual Paving Conference, to be held jointly with the Association of Asphalt Paving Technologists. Secretary and General Manager, J. E. Pennybacker, 441 Lexington Avenue, New York.

DECEMBER 1-2.—WASHINGTON, D. C.
Highway Research Board, National Research Council. Annual meeting. Director, Charles M. Upham, Washington, D. C.

DECEMBER 2-3.—PRINCETON, N. J.
New Jersey Sanitary Association. Annual meeting. Secretary, Edward Guion, Box 418, Atlantic City, N. J.

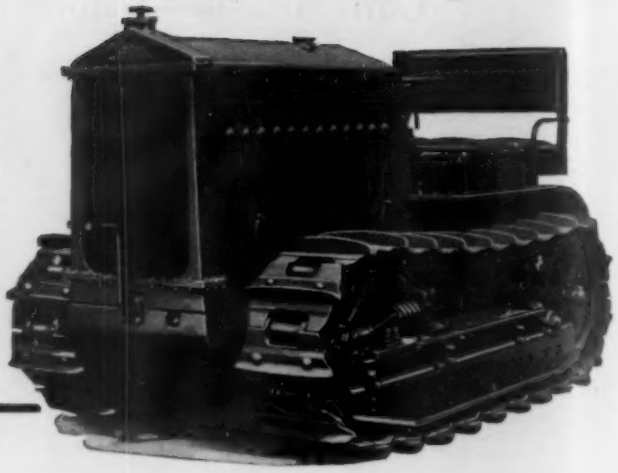
DECEMBER 9-10.—WILSON, N. C.
North Carolina Commercial Secretaries Association. Annual convention. Secretary, Joe Stubbs, Hendersonville, N. C.

JANUARY 9-13.—CLEVELAND, OHIO.
American Road Builders' Association. Annual convention and road show. Secretary, Ethel A. Birchland, Earle Building, Washington, D. C.

JANUARY 9-10.—DETROIT, MICH.
International Association of Street Sanitation Officials. Annual convention. Secretary, A. M. Anderson, 10 South La Salle Street, Chicago, Ill.

JANUARY 18-20.—NEW YORK.
American Society of Civil Engineers. Annual meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

Get the Full Meaning of CLETRAC'S Ten Greater Features!



1. Greater Pounds Pull at Drawbar. CLETRAC can handle larger implements and tandem equipment, thus covering more ground per day with less work at less cost.

2. Unusual Reserve Power. Enough extra power above its rating to handle a 20% overload at any time.

3. Positive Traction. An ability to operate in mud, swamp, ice, snow and all difficult footing without slipping or bogging.

4. Short Turning. Permits close-in work and easy maneuvering on narrow roads and in close quarters.

5. Full Power Delivery on the Turns. No slackening of pulling power when turning—constant power on both tracks.

6. "One-Shot" Oiling System. No time out required for oiling—just push the plunger and bearings are thoroughly oiled, even while moving.

7. Easy Steering. Steering is extremely easy—a light touch on the wheel gives perfect control even over rough ground.

8. Accessibility of Parts. All parts requiring occasional adjustment or attention are reached quickly and conveniently.

9. Low Gas and Oil Consumption. The broad, sure gripping tracks mean no power waste and no fuel waste.

10. Year 'Round Utility. CLETRAC'S efficiency and performance do not vary with the seasons. It is 100% useful any time of year—regardless of climate or ground conditions.

A postal or a letter will bring you the complete facts about any model of CLETRAC. Now built in a complete line.

THE CLEVELAND TRACTOR CO., Cleveland, Ohio

CLETRAC
Crawler Tractors

News and Illustrations

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

Collapsible Forms for Making Meter-Boxes

Many cities have found that concrete meter-boxes made in the city or at the actual point to be used, furnish a means of securing the advantages of meter-boxes at low cost and with particular convenience, as they can be molded into form just when needed, thus relieving the water-works management from the necessity of carrying large stocks of bulky material on hand. Straight iron collapsible forms are made by the H. W. Clark Co., Mattoon, Ill., in a variety of ways, and now two special types, the straight iron collapsible form and the tapering iron collapsible form, are offered. Both shells of the forms are made in one piece, allowing the sheet to be run through the rolling machine, thus insuring an absolutely true curvature on both shells. The inner shell is made 6 inches longer than the outer shell, allowing the concrete to be poured in with ease. There is no complicated lever arrangement to stick and bind, as concrete must not be jarred or vibrated during its process of initial set.

Clark iron collapsible forms are simple and easily operated. Spacing blocks are inserted between the shells, assuring a true box body of equal thickness. By loosening the thumb-nuts, the inner shell is automatically contracted, while a similar operation expands the outer shell, allowing both to be lifted off. Slot blocks are used to make the slots in the bottom for straddling the service pipe, permitting adjustment of depth. Dividing rings are supplied separately. The purpose of the dividing ring is to make tongue and groove in the ends of the box body so that one box body may be placed on another for deep services. Tapering iron collapsible forms make box bodies of enlarged base diameters, allowing more interior room and increased frost protection. Cities may manufacture box bodies by this method at a very slight additional cost over those made with the straight iron collapsible forms.

THE TAPERING IRON COLLAPSIBLE FORM FOR MAKING CONCRETE METER BOXES FOR NORTHERN CITIES

THE CLARK STRAIGHT IRON COLLAPSIBLE FORM FOR CONCRETE METER BOXES

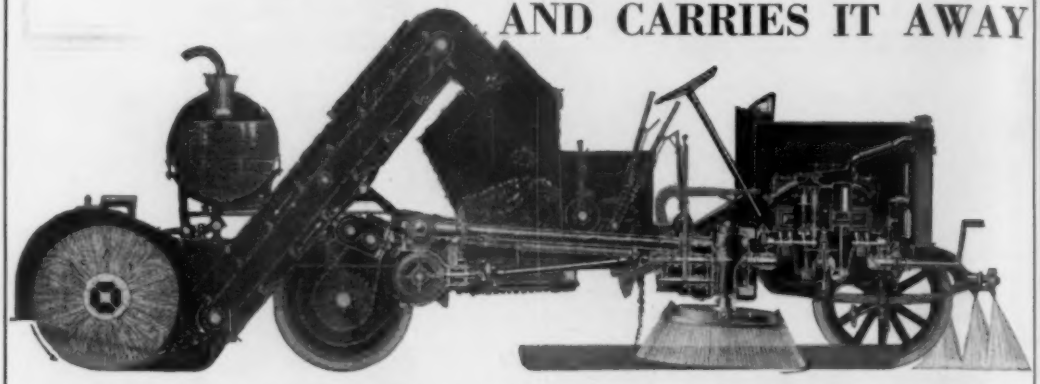
New Badger Meter Representative

F. H. Bradford, Western Sales Manager, Badger Meter Manufacturing Co., Chicago, Ill., has announced the appointment of E. L. Sandberg, 1102 Metropolitan Life Building, Minneapolis, Minn., as representative of the Badger Meter Manufacturing Co., for the states of Minnesota, North Dakota and South Dakota. Mr. Sandberg will be permanently located at the above address and will carry a full line of Badger disc, turbine and compound meters. The home office of the Badger Meter Manufacturing Co. is 841-863 Thirtieth Street, Milwaukee, Wis.

Recent Studebaker Fire Apparatus Sales

The Studebaker Corporation, South Bend, Ind., has recently made sales of Studebaker chassis for fire apparatus use as follows: Punxsutawney Fire Department, Punxsutawney, Pa., fire truck; Starkville, Miss., combination pump, booster and hose car; New Haven, Ind., triple combination pump, booster and hose car; Jefferson City, Mo., one triple combination pump, booster and hose car, and one city service ladder truck; Carrollton, Mo., a double combination two-tank chemical and hose car; Underwriters Salvage Corps, St. Louis, Mo., squad wagon; Pana, Ill., city service ladder truck and Columbia, Ill., a triple combination pump, booster and hose car.

IT SPRAYS THE STREET
AS IT SWEEPS THE STREET
AS IT PICKS UP THE DIRT
AND CARRIES IT AWAY



IN PRACTICALLY EVERY STATE—

and in hundreds of cities

In Duluth, Minnesota. In this growing metropolis streets are swept clean by up-to-date methods.

In Ithaca, New York. A factor of this city's better health and tourist attraction is cleaner streets. The work is done at low cost by modern motorized equipment.

In Santa Barbara, California. Streets are swept clean by day or night, without dust, by Austin Sweepers. The cost is most reasonable.

there are one or more Austin Motor Pick-Up Sweepers in operation.

As a factor in civic betterment, it has few equals. It sweeps the street clean from gutter to gutter. As a factor of efficient and economic administration, it is unsurpassed. It does the work quicker and at less cost. As an aid to traffic—it clears away debris, mud and tire-destroying impediments.

As a factor of health—it sweeps without dust, removing the germ-laden dirt from the street and doing it in a clean, thorough way. As a factor of public welfare and progress, it contributes to the prosperity of the citizenry. "Municipal Street Cleaning" tells the complete story of this remarkable efficient machine and the low cost of its operation. Mailed free on request.

THE AUSTIN-WESTERN ROAD MACHINERY CO.
400 N. Michigan Blvd. Chicago, Ill.

In Waco, Texas. There are 3 Austin Sweepers keeping Waco's major thoroughfares clean for traffic. No dust—the dirt is sprayed.

In Flint, Michigan. This city maintains an efficient street cleaning department. Equipment is motorized and work done at moderate cost.

In Milwaukee, Wisconsin. Narrow streets or wide—all are easily cleaned with Austin Sweepers.

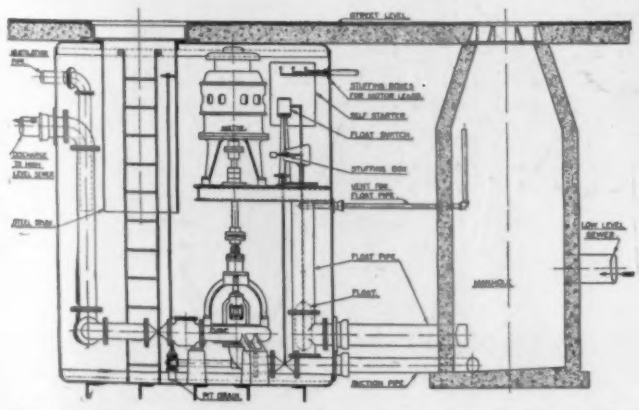
A Flood-proof Sewage Pumping-Station

It is generally admitted by competent engineers that electric motors and controlling devices used to operate sewage pumps should never, unless absolutely necessary, be located in underground chambers or vaults where they may be injured by excessive dampness and lack of attention. In some localities, however, because of the inability of the municipality to secure the necessary property adjacent to sewer lines, for the construction of a housing above the surface for electrical equipment, the installation of motors and controllers underground cannot be obviated.

In such cases there is not only the possibility of damage of condensation and lack of ventilation in the vault, but also of complete submergence of the equipment under the flood conditions. With this in mind, Yeomans Brothers Co., 1433 Dayton Street, Chicago, Ill., has developed a flood-proof underground pumping-station designed to prevent the complete filling-up of such an underground chamber under any conditions that are likely to occur.

As shown in the accompanying diagram, the main feature of this station is that, owing to the steel drum which forms the entrance to the chamber and extends down to a point considerably below the level of the electrical equipment, the motors and controllers are located in an air-locked space in the upper part of the chamber and, even with a considerable head of water over the top of the chamber and with the cover removed from the entrance manhole, the water in the chamber will not rise far enough above the bottom of the entrance drum to reach the motor windings or electrical devices or connections.

The power wires for the motor are brought in through the steel wall of the chamber with stuffing-boxes, and the ventilating pipes, if any, are carried down to the same level as the entrance drum so that air cannot possibly escape at any point above this level. The pit drain valve which is connected to the suction of the sewage pump is provided with an extension stem running up into the entrance drum, so that after flood conditions have subsided, the water remaining in the chamber can be pumped out even though it may be impossible to gain access to the pit. This flood-proof principle is applicable for use with sewage ejectors and emergency pumps in municipal and other building work to protect controllers and motors driving pumps wherever flood conditions are likely to occur.



ELEVATION OF A FLOOD-PROOF SEWAGE PUMPING STATION

Cast Iron Bureau Changes Name

The name of the Cast Iron Pipe Publicity Bureau, 566 People's Gas Building, Chicago, Ill., has been changed to the Cast Iron Pipe Research Association. This change in name was actuated by the fact that the principal functions of the organization are research and not publicity. Thomas F. Wolfe, who was for some time one of the city engineers in Chicago, and who is now Research Engineer for the Association, devotes most of his time to research and to the collection and distribution of information relative to cast iron pipe for all purposes. One of the objectives of the advertising campaign of the Association is the stimulation of interest in small towns that have no water-works, to show them the importance of having a modern water-works system.

The Association itself has nothing to sell. When community interest reaches the point where action on a water-works system is to be taken, the information is passed along to the different manufacturers of cast iron pipe and the matter is left to the manufacturers' representatives to handle.

Recent Diesel Installations in New York State

The Busch-Sulzer Bros.-Diesel Engine Co., St. Louis, Mo., through its eastern sales office, 2 Rector Street, New York City, recently sold a 400-b.h.p. diesel engine to the village of Greenport, L. I., N. Y., for installation in the existing municipal power-plant. This engine will be installed and will be running about November 1. The Greenport municipal plant is now equipped with steam engine generating units. An addition to the present building is being erected to house the new diesel unit. They expect that the over-all power cost will be reduced from 3 cents to 2 cents per kilowatt-hour after the diesel is running.

The village of Freeport, L. I., recently purchased an 1,150-b.h.p. diesel from the Busch-Sulzer Bros.-Diesel Engine Co. They already operate four of this make of diesel engines. When the fifth is installed, they will have a total capacity of 4,165-b.h.p. in diesel engines.

P. T. L. Moves Birmingham Office

The Pittsburgh Testing Laboratories, Pittsburgh, Pa., has announced that it has moved its Birmingham, Ala., laboratory and office into a new building where a Riehle testing machine of 400,000 pounds capacity has been installed. This is the largest commercial testing laboratory machine in the South. O. H. Berger is manager of the Birmingham branch of the Pittsburgh Testing Laboratory.

Hall Joins Duplex Truck Co. Sales Department

The Duplex Truck Co., Lansing Mich., has announced that C. W. Hall, formerly Manager of the Lansing Distributing Branch of the Olds Motor Works and later with the Reo Motor Car Co., has joined its Sales Department, with headquarters at Lansing.

for Economical Transportation

CHEVROLET

The

World's Lowest Ton-Mile Cost

for Construction Work

Whether you need a truck for fast, economical delivery over city streets—

—whether your problem is the transportation of ton loads over all types of highways—

—or whether you need a truck for any sort of special purpose—

—you can secure a Chevrolet Truck, with a type of body to meet your particular needs, that will give you the world's lowest ton-mile cost.*

Go to the salesroom of the nearest Chevrolet dealer and see for yourself how the sturdy, powerful Chevrolet chassis is designed and built to reduce operating and maintenance costs. Observe the deep channel steel frame, heavy, banjo-type rear axle, and long extra-leaved, semi-elliptic springs—all constructed to operate under the severest usage. Note the powerful valve-in-head motor—dependable, efficient and long-lived.

Here, in every feature, is a type of construction once undreamed of in a low-priced commercial car—

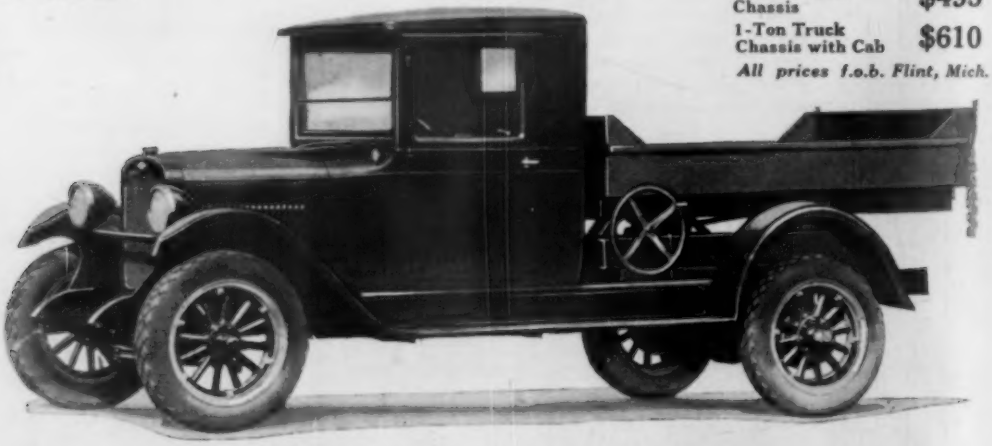
—ruggedness, strength and modern design which assure you the long-time, over-all operating efficiency that has made Chevrolet the world's most popular gear-shift truck!

CHEVROLET MOTOR COMPANY, DETROIT, MICH.
Division of General Motors Corporation

**Ton-mile cost is the cost of transporting a ton of material one mile—or its equivalent.*

½-Ton Truck Chassis	$395
1-Ton Truck Chassis	$495
1-Ton Truck Chassis with Cab	$610

All prices f.o.b. Flint, Mich.



THE WORLD'S LARGEST BUILDER OF GEAR-SHIFT TRUCKS

Do you mention THE AMERICAN CITY when writing? Please do.

Blaw-Knox Purchases Milliken Bros.

The Blaw-Knox Co., Pittsburgh, Pa., has announced the purchase of the Milliken Brothers Manufacturing Co., New York. The consolidation of the two companies became effective on September 1. The Blaw-Knox Co. is well-known through its line of steel specialties, including steel forms for concrete construction, steel buildings, open-hearth furnace equipment, air preheaters, hammer-welded products, steel transmission towers, automatic concrete-measuring devices, steel bins, clamshell buckets, etc.

The Milliken Brothers Manufacturing Co. was originally organized as Milliken Brothers, Inc., in 1857. The products of the company are transmission towers, radio towers and standard steel buildings. A considerable amount of the business of the Milliken Brothers Mfg. Co. has been in the export field and the present Milliken organization will continue to function in this field and, in addition, will take over the management of the export business of the Blaw-Knox Company on all of its products.

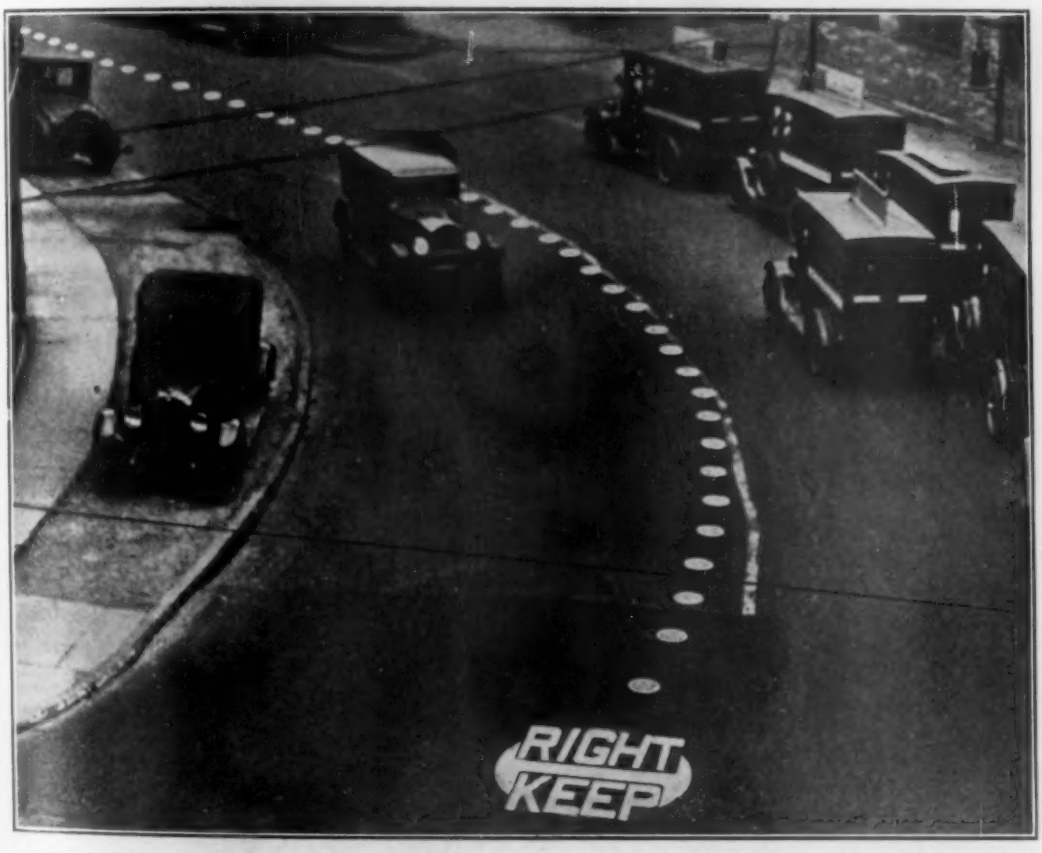
The Blaw-Knox Co. announces that it will continue with its present organization to handle domestic business and the acquisition of the Milliken company will make no change in this line. Manufacturing for both companies will be concentrated at the Blaw-Knox Co. plants at Pittsburgh and Baltimore.

Consultants for Mt. Hope, R. I., Bridge

Robinson and Steinman, consulting engineers, 25 Church St., New York, have been retained to prepare the plans and specifications and supervise the construction of the Mt. Hope Bridge to be built across Mt. Hope Bay between Bristol and Portsmouth, R. I. The bridge will be financed as a toll bridge enterprise by a group of bankers headed by William R. Compton Co. and Peabody, Houghteling & Co. The structure will be a suspension bridge with a main span of 1200 feet. The total cost of the project will be about $3,500,000.

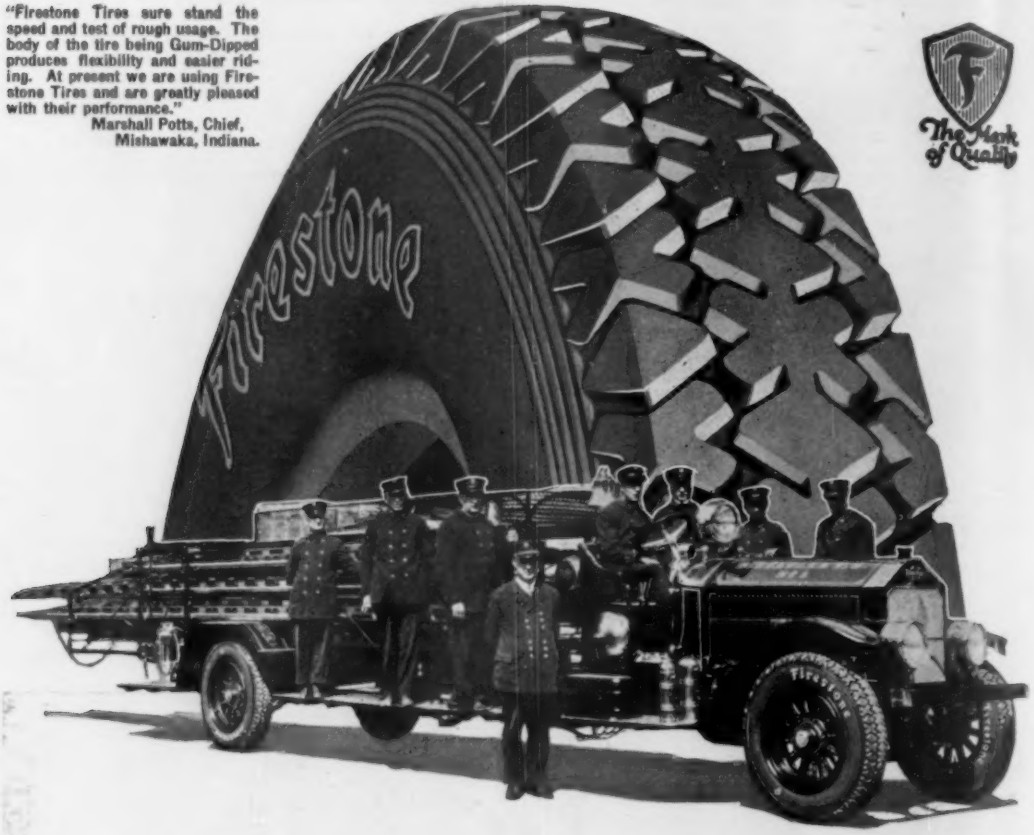
Kuhlman Appointed Heil District Manager

The Heil Co., Milwaukee, Wis., has announced that George Kuhlman, well known among the truck men of Philadelphia and New York, has been appointed District Manager, covering the eastern territory. Mr. Kuhlman has been associated with the Heil Co. since 1919, going to Philadelphia in 1922 to open the Heil Co. branch in that city. His thorough knowledge of the dump-truck business and familiarity with the eastern territory make him well qualified for his position. Mr. Kuhlman will make his headquarters at the Heil Co. branch, Rawson Street and Queens Boulevard, Long Island City, N. Y.



AN EFFECTIVE BLIND CURVE LAYOUT USING WAMBLU FABRIC LETTERS AND 12-INCH FABRIC DISCS
The authority of these large white discs solved a bad traffic problem on a cross street entering a main city thoroughfare with a sharp blind curve. Note the faint white line representing the remainder of a former painted divider

"Firestone Tires sure stand the speed and test of rough usage. The body of the tire being Gum-Dipped produces flexibility and easier riding. At present we are using Firestone Tires and are greatly pleased with their performance."
Marshall Potts, Chief,
Mishawaka, Indiana.



Stamina and Safety for Any Emergency

Take the time to study the Firestone Non-Skid tread, which is protecting so many fire-fighting trucks throughout the country. Note the vast number of skid-resisting edges and safety angles, scientifically placed to prevent side slip.

The Firestone tire carcass is built of cords dipped in rubber solution — the Firestone process of insulating every fiber of every cord with rubber, protects the tire from heat and friction. This rubber insulation around every fiber of every cord, reinforces the whole structure of the tire, giving it greater reserve strength.

The Firestone Dealer in your locality is an expert in tire construction and service. He will gladly call on you and work out a special service plan for your apparatus. Write or phone him today.

MOST MILES PER DOLLAR

Firestone

GUM-DIPPED TIRES

AMERICANS SHOULD PRODUCE THEIR OWN RUBBER . . Harvey S. Firestone

A HARDESTY FOUR-WAY WELDED-LETTER STREET SIGN

Four-Way Corner Street Signs

A four-way corner street sign makes it possible for automobile drivers or pedestrians to know the cross section streets considerably in advance of the time at which they arrive at them. It eliminates the necessity of a driver's turning around in his seat in the middle of the street intersection to ascertain the name of the street he is crossing. This difficulty has been the cause of many serious accidents in the past.

These street signs, made by the R. Hardesty Manufacturing Co., Denver, Colo., are spot welded back to back at the ends. The lower signs rest on a bracket or casting which is provided with two grooves into which the signs are inserted or fitted. The center casting is grooved to fit and rests on top of the lower signs and is so arranged as to permit of the upper sign being placed at any desired angle. A grooved casting slips down over the upper sign, and this is topped with an attractive cast iron top piece. This top casting screws onto a threaded rod which extends up from the bottom casting through both signs and eliminates any possibility of the signs' becoming loose.

The signs are said by the manufacturer to be indestructible. The sign is a heavy plate of iron proofed against stones, shotguns or other missiles. The black bicycle enamel which is baked on the plate, and the bright, durable, non-tarnishing aluminum of the letters, are not harmed by exposure to weather.

New Publicity Director for Dorr Company

The Dorr Co., 247 Park Avenue, New York, has announced the appointment of A. Anable as Director of Publicity. Mr. Anable has been connected with the Equipment Sales Department of the Dorr Co. for several years.

Tar Products Consolidation

The American Tar Products Co., Inc., announces that the Tar Products Corporation, of Providence, R. I., is now affiliated with it, and will operate as the New England Division of the American Tar Products Co. Operations will be continued as before.

Graver Appoints Southern Representatives

The Graver Corporation, East Chicago, Ind., has announced the appointment of Robbins & Robbins, 801 Tchoupitoulas Street, New Orleans, La., as sales representatives in the states of Louisiana and Mississippi. This organization will handle the complete Graver line, consisting of water softeners, filters, tanks and steel plate equipment.

Twin Cylinder Hydro-Hoists for City Trucks

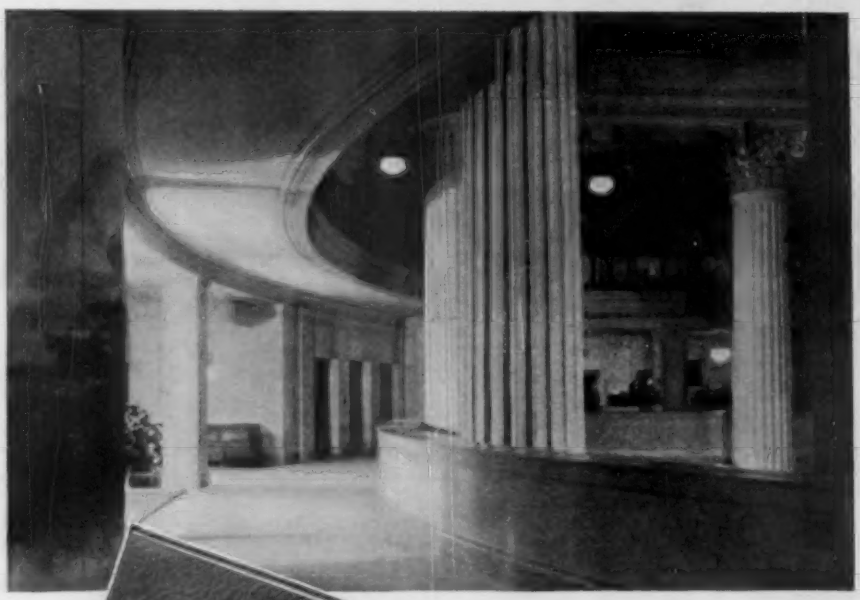
During the last year, there has been a tremendous demand from all parts of the country for steel bodies, hoists, sprinklers and truck tanks from municipalities, according to the Heil Co., Milwaukee, Wis. Cities are insistent that their transportaton problems be handled efficiently and thoroughly, and as a result new equipment is replacing obsolete or worn-out types. In those cities where the equipment has not yet been motorized, great strides have been made to secure the best of motor equipment for every department. At this season of the year, the greatest attention is focused on garbage collection. The amount of garbage collected in the months of August and September often is 150 per cent or more of the yearly average.

Different cities have varying ways of handling garbage collection and all agree that the body should be made as low as possible to facilitate hand loading. The Heil hoist, made by the Heil Co., Milwaukee, Wis., is well adapted for this work because it gives a low mounting. Garbage bodies made by Heil are usually wide and long, with provision for carrying considerable material in the crown, which can be left open or covered with tarpaulin or steel, whichever seems best for the particular territory.

The city of Buffalo, N. Y., has recently purchased a fleet of trucks for the Department of Public Works which includes several with special Heil Model-80 garbage bodies. These units are all mounted on Model-55 White trucks, 174-inch wheelbase, and are used in the downtown section of Buffalo.

In some of the southern cities, including Knoxville, Tenn., and Washington, D. C., smaller bodies are used with a Heil hand hoist. The bodies are all made with duck-tail rear end. The mounting height is kept down by lowering the hoist into the chassis frame. A great saving has been effected by the city in the collection and disposal of the garbage as compared with costs with mule-drawn carts. For the collection of liquid garbage a sump is provided to prevent liquid from dripping into the streets. In this type of construction, Heil welds all seams to make the body absolutely watertight.

Closely associated with the collection of garbage is that of ash and rubbish collection, which includes street sweepings, leaves, waste building materials and the like. The same body equipment is used for this work, although here it is not as essential that the rear end of the body be duck-tailed or that the bodies themselves be watertight.



A copy is yours for the asking. It will be gladly sent you, upon request—and at no cost or obligation whatever. Write Department H-11.

For Folks Like You

THIS *de luxe* booklet is for folks like you—folks who appreciate beauty, durability and economy combined, as they apply to modern buildings.

"The Everyday Uses of Marble" is just what its title suggests. It is a most interestingly written and beautifully illustrated printment of facts regarding the many everyday uses of marble, incident to both home and commercial adaptations.

The many illustrations—made from actual photographs—show numerous examples of present-day treatments in the home, the garden, business and public buildings.

NATIONAL ASSOCIATION OF MARBLE DEALERS

ROCKEFELLER BUILDING - CLEVELAND, OHIO

There is No Substitute for Marble

BUTLER VACUUM SWEEPER OWNED BY DEPARTMENT OF STREET CLEANING, NEW YORK CITY. THIS IS ONE OF THIRTEEN SUCH MACHINES OWNED OR ORDERED BY THE DEPARTMENT

A Vacuum Street Sweeper

The Butler sweeper, made by the Butler Manufacturing Co., 1810-1816 East 24th Street, Cleveland, Ohio, utilizes a revolving broom and the suction from a powerful fan to remove dust and debris from streets. A standard automotive motor of approved design furnishes the power to propel the vehicle along the street. The power is taken off the drive shaft by means of a clutch to drive the fan, broom and conveyor.

The broom is of special sectional design, so arranged that any one or all of the sections can be adjusted or replaced in a very few minutes' time. The sectional feature also insures low replacement cost as it is often practical to use four new sections and four old ones. The broom material is imported hard fiber.

The broom loosens the debris and picks up the heavier materials, delivering it to an inclined belt conveyor which carries it upward and forward, dumping it into the dust compartment. The fine dust is sucked up by the suction from the fan and sifts through 240 vacuum cleaner bags carried in the top of the body structure. This dust finally drops from the hopper into the dust compartment and is removed with the heavier material. The machine is equipped throughout with ball or roller bearings. Its operation is entirely dustless and without water.

The driver is located in front where his view is unobstructed and he controls the sweeping mechanism with a single lever. The dust pan can be raised when not operating, the broom case "floats" to provide for uneven surfaces of pavements and is supported in the rear with two rubber tired casters. Only one broom is used, no gutter broom being required. The construction is rugged, the control is simple and the operation quiet.

The Butler Manufacturing Co. states that ten machines are ordered for the Department of Street Cleaning, New York, which already has used three Butler sweepers for three years. In addition, installations are also in operation in Detroit, Cleveland, St. Louis, Chicago, Houston and Dayton.

New Pacific Coast Manager

The McIntosh & Seymour Corp., Auburn, N. Y., has recently announced the appointment of Frederick M. Fisk as Manager of its Pacific Coast office at 815 Sheldon Building, San Francisco, Calif. Mr. Fisk is well known in the Pacific Coast territory through former connection with various important engineering enterprises and has had extensive diesel-engine experience in the McIntosh & Seymour plant at Auburn, N. Y., and outside.

Rubber Tracks for Tractors

Rubber tracks for Caterpiliar tractors have now passed the experimental stage and are being sold by the Caterpillar Tractor Co., Peoria, Ill., and San Leandro, Calif., for use in industrial plants and where finished road surfaces demand extremely light treading power. The rubber track as it is used on the 2-ton and Thirty models of Caterpillar tractors consists of a series of separate rubber pads approximately 1½ inches thick bolted to the track assembly.

The track has been tested for three years under most severe conditions, and its life seems surprising until one considers the great length and width of the rubber surface which at all times is in contact with the ground. The rubber tread on a Caterpillar 2-ton tractor presents a ground contact of approximately 748 square inches, which contrasts with the very small surface of an automobile or motor truck tire that is in contact with the ground. With this great road surface in constant contact, there is very little slippage and consequently the wear is slow. The tracks cushion the road-shock and thereby lengthen the life of the entire mechanism.

new police model with fore wheel brake FOR 1928

FOR 1928 Harley-Davidson announces the most advanced models in the history of the motorcycle industry. Every police department and every member of a mounted squad should know all about these new improved models.

Outstanding feature for 1928 is the Fore Wheel Brake — *doubled safety.* Other improvements are: Throttle controlled motor oiler — air cleaner — positive gear shift lock gate.

Greater stability! Increased safety! Longer life! Those are the features that are throwing the spotlight on the 1928 Harley-Davidson models.

No increase in prices. Ask your local dealer for a demonstration — and write for special police literature.

HARLEY-DAVIDSON MOTOR CO.
DEPT. M. MILWAUKEE, WIS.

HARLEY-DAVIDSON
Motorcycles

Riddell Buys Three Companies

The W. A. Riddell Co., Bucyrus, Ohio, has announced the purchase of the Hadfield-Penfield Steel Co., the American Clay Machinery Co., and the Era Steel Co. It is stated that the business of these companies will be continued and developed and an endeavor made to improve the products as well as the service.

Main-Line Meters for Water-Works

In order to obtain complete information regarding the efficiency of a water-works pumping-station, it is necessary to have a master meter. The Sparling main-line meter, made by R. W. Sparling, 945-951 North Main Street, Los Angeles, Calif., is a velocity type meter built specially for this service. The vanes inserted within the pipe average the stream flow, are simple to install, stand up under hard usage, and are easily accessible for repairs, but inaccessible for tampering.

When a Sparling meter is to be installed in any steel or cast iron main, a hole is cut in the top of the pipe and the meter saddle bolted on. It may be mounted on either suction or pressure pipes, horizontally, vertically, or slanting, and with the head upright or sideways. The manufacturer claims that the Sparling meter costs about one-third as much as other standard metering devices, it requires no expensive servicing or upkeep, and it brings to light any losses or leakages in the water system. It is so built that it involves practically no loss of head through the meter. Six-inch meters and larger show a net loss of head caused by the drop pipe and propeller fan approximately equal to the friction loss through 25 feet of pipe of the same size. The impairment of cross-sectional pipe area in meters over the 6-inch size is but 3 to 6 per cent, and that only for a few inches of length. Alemite force-feed lubrication reaches all the inside moving parts of this meter. The shaft, gears and ball bearings are hardened stainless steel, good for years of wear, but easily and cheaply replaceable when necessary.

The Sparling metrograph recording attachment for the Sparling meter carries the work of the meter a step farther and preserves automatically a detailed record of the quantities flowing through the pipe at all times, showing sudden demands, irregular flows, normal demands between different hours, and other facts recorded indelibly.

Change in Firm Name

Announcement has been made of the change of name of the firm of F. G. Gordon & Bulot, successors to Maury & Gordon, Consulting Engineers. Address, Monadnock Bldg., Chicago, Ill.

Texas Co. Moves Philadelphia Office

The Asphalt Sales Department of the Texas Company, 17 Battery Place, New York, has announced the removal of its Philadelphia office to 608 Franklin Trust Building. W. J. King is Asphalt Sales representative in Philadelphia.

Meter Manufacturer Establishes Laboratory

Believing that a research department would be valuable to the water-works industry as well as to its own interests, the Pittsburgh Equitable Meter Co., Pittsburgh, Pa., has installed a complete research laboratory to bring every aid of modern science into the design and manufacture of water meters. According to the Pittsburgh Equitable Meter Co., to design a type of meter which will be satisfactory in the great majority of installations, is entirely possible, but to design one type of domestic meter which will be satisfactory under all conditions, is not possible. The solution of the electrolysis problem lies mostly with control of stray currents by the electric company. As an illustration, this company has resorted to electroplating in certain parts for three distinct purposes: to prevent corrosion, to provide a harder wearing surface which will have a longer life, and to decrease friction losses. Investigations which the company has recently conducted along these lines, indicate that very little effort has been put forth to get beneath the surface and that great improvements can be made in reducing losses from corrosion, wear and friction.

The laboratories are in charge of L. M. Van Der Pyl, who has had a specialized education and training which makes him particularly fitted for this line of work. He has had a wide industrial experience and has carried on research work at Harvard University with particular relation to corrosion and the analysis of water. He has also been employed by the Bureau of Standards in an investigation of water-meters.

The services of the research department are available to any one in the water-works industry, and the department will gladly answer any questions regarding corrosion, water analysis or electrolysis, and assist customers in developing improved processes or eliminating sources of trouble. The laboratories of the Pittsburgh Equitable Meter Co. are open to all water-works executives at all times and a cordial invitation is extended to any one interested in this field to visit them.

THE SPARLING MAIN-LINE WATER-METER SHOWING MEASURING UNIT AND REGISTER EXTENSION

The Mark of Dependable Property Protection

The siren shrieks; the fire truck thunders by. Danger threatens—but even greater danger lies in the path of regular traffic. Speeding cars, reckless drivers, often approach without warning. A child dashes out of the unfenced school grounds—another accident!

But municipal boards have the power to prevent these traffic accidents—to make school and playgrounds safe. Hundreds of school and park boards have set the example by enclosing the property under their jurisdiction with Cyclone Fence.

Cyclone Chain Link Fence is the recognized standard for enclosing public property. The Cyclone Fence Company will erect fence complete.

Write nearest offices for full information, including list of schools that have installed Cyclone Fence.

CYCLONE FENCE COMPANY

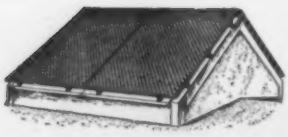
Main Offices: WAUKEGAN, ILL.

Works and Offices:
North Chicago, Ill. Cleveland, Ohio Newark, N. J. Fort Worth, Texas

Pacific Coast Distributors: Standard Fence Co., Oakland, Calif.
Northwest Fence & Wire Works, Portland, Ore.

Direct Factory Branches:
Atlanta, Boston, Buffalo, Baltimore, Charlotte, Cincinnati, Des Moines, Denver, Detroit, Hartford, Conn., Houston, Jackson, Mich., Indianapolis, Kansas City, Los Angeles, Minneapolis, Milwaukee, New Orleans, Philadelphia, Pittsburgh, St. Louis, San Francisco, Seattle, Syracuse, Tulsa.

We Erect Fence Anywhere



Cyclone Skylight Guards, built to measure. Also partitions, signs, and all types of woven wire work.

Cyclone Fence
REG U.S PAT OFF

Cyclone Window Guards, built to measure for any size opening.

The only chain link fence made entirely of copper-bearing materials — for maximum endurance.

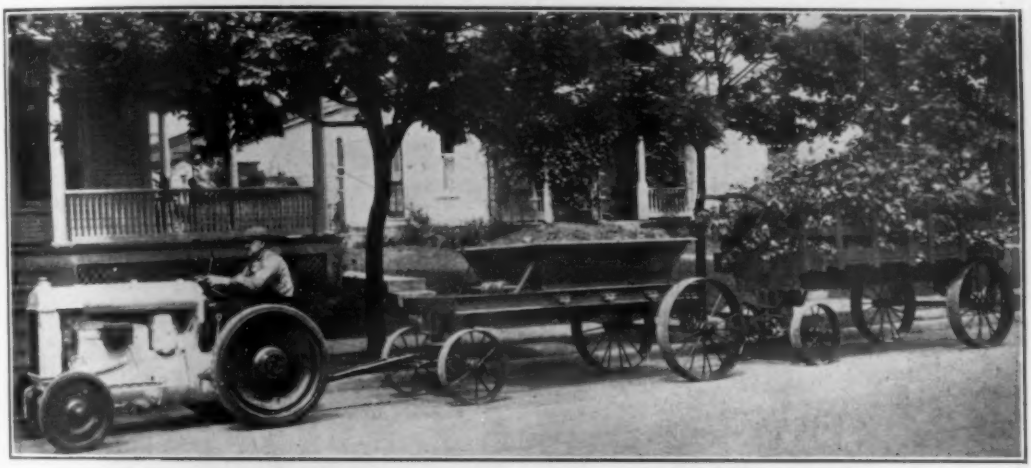
C. F. Co., 1927

Bottom-Dump Trailers for Trash Collection

Early this year the Miami Trailer-Scraper Company, Troy, Ohio, placed its new bottom-dump trailer on the market. These trailers were designed especially for tractor use. They are of all-steel construction and equipped either with all-steel wheels, or solid rubber tires.

These bottom-dump trailers are used in various cities for gathering street sweepings, leaves, ashes, tin cans, dry garbage and numerous other items. They are designed especially for use in connection with tractors and make an excellent unit for use behind rubber-tired tractors. They are furnished in two different sizes. The smaller trailer has a capacity of 1½ yards, water level, and the larger trailer has a capacity of 2 yards, water level. When operating over paved streets, these trailers may be pulled in trains behind the tractor. The train consists of two or three units. When the trailers are used in trains, it is necessary to mount an extra hitch connector on the rear cross member of each trailer.

In the illustration is shown a platform body trailer attached to a bottom-dump trailer. The platform-dump trailer is suitable for hauling limbs. It may also be used for hauling leaves in the fall. In the winter time the bottom-dump trailer serves as an economical means of removing snow from the streets, as a rubber-tired tractor can easily handle three of the 2-yard trailers. The trailers may be pulled over a bridge or manhole, so that the load may be dumped through the opening and thus quickly disposed of.



MIAMI TRAILERS EQUIPPED WITH STEEL DUMP BODY AND STAKE BODY

New Brick Association Secretary

The National Paving Brick Manufacturers Association, 332 South Michigan Ave., Chicago, Ill., has announced the election of Miss E. L. Beller as Secretary. Miss Beller over ten years ago chose association work as her special field of endeavor. Prior to her recent appointment, she served the Association as Assistant Treasurer, which office she now retains in addition to the Secretaryship. Miss Beller is President of the Women's Club of Cleveland, Ohio, and is a former Vice-President of that organization.

Standardized Traffic Signs

A standardization of signs for safety and traffic control is the trend now in cities, towns and villages, as well as in highway use. Since a national movement sponsored by the Hon. Herbert C. Hoover as Chairman of the National Highway and Safety Conference has made possible the standardization of signs both as regards shape and color for highway use, other national organizations interested in safety work are constantly advocating standardization of signs for municipal use, that will be in keeping in a general way with the signs used as standard upon the highways.

In keeping with the practice employed by State Highway Commissions, that the shape of a sign should carry a definite and known command to the driver even though the lettering should not be visible, due to distance or location, the Essco Manufacturing Co., Peoria, Ill., has developed a line of traffic signs constructed along the lines mentioned above.

For railroad crossings, the round or circular sign only is used by this company. The octagonal sign always designates "Stop." The diamond shape sign denotes "Danger," "Slow Down," "Be Alert," and the square or oblong sign is used for informative purposes, such as calling attention to schools, hospitals, city limits, etc.

Highest grade, specially treated, heavy-gage steel is used in the construction of these signs. Perfect shapes, smooth edges and well-balanced lettering provide a sign exceptionally readable and pleasing to the eye as well as durable.

Each sign is finished with a minimum of four coats of lacquer, providing a durable, lustrous and distinctive surface, comparable in every way to the finish used on high grade automobiles. All lettering is of the plain block-letter type, visible against the yellow background even under adverse conditions.

The signs are supplied as standard in the 20-inch size, this being somewhat smaller than the average highway sign and yet sufficiently large for city street use. They can be furnished with a specially designed socket to accommodate a 2-inch pipe, this socket being equipped with two headless setscrews for tightening on the pipe. The socket is

CHICAGO

Has Just Finished Installing 6,750 Additional

CHICAGO CONCRETE Lighting Standards

TOTAL TO DATE

21,550 Concrete Lighting Standards (*359 Car Loads*)

THE LARGEST STREET LIGHTING JOB IN THE WORLD

Chicago Concrete Lighting Standards are manufactured by a jogging, vibration process, which was specified after numerous exhaustive tests, to be *used for the largest street-lighting job in the world.*

CHICAGO CONCRETE STANDARDS have been selected by the City of Chicago, the Chicago South Park Commissioners, and many other park commissioners and municipalities for their superior strength, beauty of design and finish, and their low first and maintenance costs.

Let us help you solve your lighting problems!

CHICAGO CONCRETE POST COMPANY

PAUL K. FLEMING, President

Lawrence, Lamon and Leland Avenues

Chicago, Illinois, U. S. A.

spot welded to the sign proper, providing a rigid support, and is finished in yellow. When desired, these signs can be mounted on existing posts or wooden posts to be set, in which event they are shipped having ½-inch holes drilled at the top and bottom.

New Scaife Appointment

Wm. B. Scaife & Sons Co., Pittsburgh, Pa., manufacturers of steel tanks, range boilers and water purifying apparatus, have announced the appointment of J. R. Sproat as Superintendent. Mr. Sproat succeeds the late H. A. Meckel, whose death occurred several months ago. Mr. Sproat has worked in all departments of the company, and has an intimate knowledge of the various problems confronting the manufacturers.

Republic Purchases Linn

The Republic Motor Truck Co., Inc., Alma, Mich., has purchased the entire capital stock of the Linn Manufacturing Corporation, Morris, N. Y., tractor manufacturers, and is now the sole owner of that company, including its plant, equipment, good will and exclusive selling rights. The operation of the Linn Manufacturing Corporation will be continued at Morris, N. Y., as a division of the Republic Motor Truck Company, Inc. The present personnel will also be maintained.

The Linn Manufacturing Corporation has been building a special type of tractor in Morris, N. Y., since 1916. The Republic Motor Truck Co. is one of the leading truck manufacturers in the industry, producing a complete line of trucks since 1913.

The Linn tractor is a heavy hauling machine equipped with either a 75-horsepower or a 100-horsepower engine. It resembles a heavy motor truck, except that revolving tracks take the place of rear wheels. The motor and front wheels are identical with those of any heavy-duty truck. Its exclusive features are protected by patents.

A Flexible Safety Signal for Traffic Control

A sure-stop safety signal, made of rubber reinforced with fabric, that is easy to install and gives uninterrupted service, has been produced by the Standard Traffic Marker Co., 1711-1713 East Second Street, Wichita, Kans. On through streets, crossings, street intersections, or wherever the traffic needs a signal, this rubber "Stop" sign will save the city and community many serious accidents, prevent property damage, injury and possible loss of life.

The signal is made of pure gum tread rubber, reinforced with cotton fabric which insures flexibility and long wear. The inlaid rubber letters are of contrasting color, which attracts attention and insures visibility at all itmes. The sign is held firmly in place between two creosoted rot-proof oak wedges, which have round shoulders next to the signal. This prevents wearing and breaking the rubber and insures maximum service. The wedges are held securely in the pavement by anchor plates.

The complete signal is installed in a groove in the pavement 22 inches long, 3 inches wide and 2½ inches deep. The flexible rubber top is the only part that projects above the pavement surface. It may be removed and replaced in five minutes by simply releasing the anchor bolts at each end.

Standing 7 inches high in the middle of the street, the signal cannot be overlooked, yet it is not an obstruction in the street. Unlike most traffic devices, it can be driven over at will without danger. It shows brilliantly when viewed from a distance or when viewed close up from the side. The background is made of jet black rubber and the word "Stop" is inlaid with yellow rubber letters, vulcanized in place. Heat, cold, rain and snow do not affect it.

Brown Made District Sales Manager

The General Electric Co., Schenectady, N. Y., has announced that William E. Brown, Manager of the Central States Department of the New York district, has been appointed New York District Sales Manager of the company. Mr. Brown's headquarters will be at 120 Broadway, New York.

Kinney Becomes General Manager of Cyclone Fence Co.

The Cyclone Fence Co., Waukegan, Ill., has announced the appointment of J. H. Kinney as General Manager. Mr. Kinney succeeds J. W. Meaker, who resigned as General Manager recently to become President of the Bates Valve Bag Co. of Chicago. During the three years which Mr. Meaker had served as General Manager and Treasurer of the company, Mr. Kinney was closely associated with him as General Sales Manager and was considered well deserving of promotion to the position made vacant by Mr. Meaker's resignation. Mr. Kinney has been connected with the Cyclone Fence Co. since 1910. Other appointments in the Cyclone Fence Co. are G. H. Chapman, General Sales Manager; A. W. Kirkham, Treasurer; W. M. Jensen, Assistant Treasurer; R. E. Pinniger, Eastern Sales Manager with offices at Newark, N. J.; and S. W. Burr, Sales Manager at Cleveland, Ohio.

New Gamewell Officers

The Board of Directors of the Gamewell Company, Newton Upper Falls, Mass., has announced the election of two new Vice-Presidents. A. D. Wheeler, District Sales Manager, Boston, and Arthur L. Tinker, District Sales Manager, New York, are the newly elected executives. This honor has been conferred in recognition of the long and faithful services of these two men to the company. Both men have been associated with the Gamewell Company for practically their entire lives and are familiar figures in the fire-alarm and police signaling field. Mr. Wheeler has been connected with the company for 38 years, being at present District Sales Manager for the New England States, while Mr. Tinker's service record amounts to 31 years and his present position is that of District Sales Manager for the Middle Atlantic States.

Other officers elected at this meeting for the ensuing years are V. C. Stanley, President and General Manager, W. C. Beck, Treasurer, and W. J. Miller, Assistant Treasurer.

. . . for a permanent, beautifying, pole installation consult Elreco. Lamps are hung at proper heights; wires are inexpensively carried overhead. The Electric Railway Equipment Company, Cincinnati, Ohio